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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLVI—No. 8

October, 1920

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AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS OF THE SOCIETY

September 15th, 1920.—The meeting was called to order at 8.30 P. M.; Nelson P. Lewis, M. Am. Soc. C. E., in the chair; Herbert S. Crocker, Acting Secretary; and present, also, 633 members and guests, including about 200 ladies and, also, by invitation, members of the American Society of Mechanical Engineers.

Such an unusually large audience gathered to hear the speaker of the evening, John R. Freeman, M. Am. Soc. C. E., and Past-President Am. Soc. M. E., that it was necessary to adjourn from the usual meeting room to the Main Auditorium of the Engineering Societies Building. Mr. Freeman's interesting address on "Some Recent Engineering Developments in China and the Far East", was illustrated by 100 lantern slides carefully selected from his collection of 500 or 600 slides relating to works of engineering interest in Japan and China, including particularly the work on the Grand Canal in China, with which he was connected.

The Chairman expressed the deep appreciation of the audience both to Mr. Freeman and to the Programme Committee for Second Meeting of Each Month for having selected such an attractive and interesting subject, and also expressed pleasure at the presence of so many ladies.

Adjourned.

October 6th, 1920.—The meeting was called to order at 8.30 P. M.; Vice-President Francis Lee Stuart in the chair; J. P. J. Williams, Assoc. M. Am. Soc. C. E., acting as Secretary; and present, also, 219 members and guests.

The minutes of the meetings of the Annual Convention, August 10th, 1920, and of the meeting of September 1st, 1920, were approved as printed in *Proceedings* for September, 1920.

The Chairman announced the appointment by the Board of Direction of Messrs. O. E. Hovey, Chairman, C. K. Conard, E. B. Day, Alfred D. Flinn, R. R. Gould, William G. Grove, J. P. Hallihan, H. W. Hudson, F. T. Llewellyn, F. R. McMillan, George Perrine, Arthur I. Perry, H. M. Pirnie, Charles S. Rindsfoos, L. H. Shoemaker, J. P. J. Williams, and F. P. Witmer as Tellers to canvass the ballots for the proposed amendments to the Constitution.

It was announced that at the meeting of the Executive Committee of the Board of Direction on September 10th, 1920, a motion that the minutes of the Business Meeting of the Society of September 1st, 1920, be issued in pamphlet form with the September *Proceedings,* failed to carry by a tie vote of 2 "ayes" to 2 "noes".

It was announced that, under the authority given by the Board of Direction at its meeting of August 9th, 1920, the Acting Secretary had arranged with the New York Section of the Society to take over the second meeting of the month, and that until further notice the meetings of the New York Section will be held on the third Wednesday of each month in place of the Society meeting.

The following deaths were announced:

CHRISTOPHER LAWRENCE GATES, of Toledo, Ohio, elected Junior, December 4th, 1878; Member, September 5th, 1883; died August 30th, 1920.

GEORGE LEIGHTON, of Glenburn, Pa., elected Member, October 3d, 1906; died September 13th, 1920.

ARCHIBALD BYRON LUEDER, of New York City, elected Member, May 31st, 1910; died August 21st, 1920.

WILLIAM HARLEY MOORE, of New Haven, Conn., elected Member, June 4th, 1895; died September 5th, 1920.

EDWIN THACHER, of New York City, elected Member, February 17th, 1869; died September 21st, 1920.

WILLIAM HENRY DIETRICH, of Bombay, India, elected Associate Member, January 4th, 1910; died August 11th, 1920.

CHARLES CLAYTON HUFF, of Fort Rosecrans, Cal., elected Associate Member, November 12th, 1913; died August 1st, 1920.

At the request of the Acting Secretary, the Chairman put to a rising vote of those present a motion that it was the sense of the meeting that it prefers to change the time of convening the meetings of the Society from 8.30 P. M. to 8 P. M. A large majority favored 8 P. M.

A paper by A. W. Robinson, M. Am. Soc. C. E., entitled "Larger Ships, Deeper Harbors, and Better Dredges", was presented by the author and illustrated with lantern slides. The subject was discussed orally by Messrs. Walter H. Gahagan, T. Kennard Thomson, J. V. Davies, Edward Burr, J. H. H. Muirhead and

Francis Lee Stuart. Written discussions on the paper from Messrs. E. J. Dent, Walter S. Wheeler, George B. Massey, Walter Ferris, and Charles Evan Fowler were received, but were not read because of lack of time.

The report of the Tellers appointed to canvass the ballots for the proposed amendments* to the Constitution, was presented by Chairman Hovey, who announced that Amendment "A", which adds to Section 3 of Article I a statement regarding the secondary object of the Society, failed by 224 to receive the necessary two-thirds vote; that Amendment "B", which adds Section 9 to Article II in regard to Local Sections and membership therein, failed by 416 votes; that Amendment "C", which increases dues of Non-Resident Members, was adopted by a margin of 284 votes; that Amendment "D", which changes the requirements for the election of Honorary Members, was adopted by a margin of 523 votes; that Amendment "E", which provides that no member of the Nominating Committee shall during his term of office be a candidate for any other office, was adopted by a margin of 735 votes; that Amendment "F", which reduces the number of Directors and the requirements regarding residence in District No. 1 and the representation of that district on the Board, failed by 307 votes; and that Amendment "G", which amends Articles VII and VIII to provide new methods for nominating and electing officers and for an Annual Conference of Representatives of Local Sections, failed by 448 votes.

Adjourned.

Report in Full of Tellers Appointed to Canvass Letter-Ballot on Amendments to the Constitution

The report in full of the Tellers appointed to canvass the ballots upon the proposed amendments to the Constitution is as follows:

"NEW YORK, October 6th, 1920.

"The Tellers appointed to count the ballots upon the amendments to the Constitution submitted to letter-ballot of the Corporate Membership by the general business meeting of the Annual Convention of 1920, presents its report as follows:

"Total number of ballots received		4 781
"Excluded ballots:		
"From members in arrears of dues	199	
"Without signature	21	
"From members other than Corporate Members	12	
"With identification other than written signature	27	
"From member deceased since voting	1	260
"Total ballots counted		4 521

* Published in full in *Proceedings*, Am. Soc. C. E., September, 1920, p. 722.

Results of Letter-Ballot, by Geographical Districts.

District No.	Ballots Counted Upon Amendment: "A"		"B"		"C"		"D."		"E."		"F."		G."	
	Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1—Foreign...	36	29	22	43	43	21	48	15	53	11	29	33	26	37
1—Resident..	318	509	278	549	578	224	556	240	592	207	278	544	262	555
2.....	158	176	140	192	234	86	262	57	279	41	150	184	135	196
3.....	120	126	109	137	139	102	171	69	179	63	121	125	111	132
4.....	309	115	303	123	338	80	361	54	379	39	305	117	300	120
5.....	190	112	182	120	222	77	238	62	245	54	190	111	170	128
6.....	294	123	280	138	322	88	334	76	360	49	287	129	271	141
7.....	270	57	258	69	260	64	262	56	263	56	268	56	256	67
8.....	254	144	243	153	275	110	302	84	324	64	236	158	224	169
9.....	147	107	129	125	171	79	195	53	208	41	147	104	131	118
10.....	154	80	145	89	158	71	184	48	198	35	148	83	141	91
11	224	53	206	71	210	62	230	43	253	22	218	57	206	66
12.....	156	27	153	31	143	41	152	26	165	15	155	28	150	31
13.....	146	65	136	75	131	80	151	55	172	35	143	68	132	78
Total...	2 776	1 723	2 584	1 915	3 224	1 185	3 446	938	3 670	732	2 675	1 797	2 515	1 929
Required to carry.....	3 000		3 000		2 940		2 923		2 935		2 982		2 963	
Carried by...	.....		.....		284		523		735		.....		.....	
Lost by	224		416		.....		.....		.....		307		448	
Total vote....	4 499		4 499		4 409		4 384		4 402		4 472		4 444	
Percentage "Yes".....	62		57		73		79		83		60		57	

"Respectfully submitted,

"(Signed) Otis E. Hovey, *Chairman.*

C. K. Conard
E. B. Day
Alfred D. Flinn
R. R. Gould
Wm. G. Grove
J. P. Hallihan
H. W. Hudson
F. T. Llewellyn
F. R. McMillan
George Perrine
Arthur I. Perry
H. M. Pirnie
Chas. S. Rindsfoos
L. H. Shoemaker
J. P. J. Williams
F. P. Witmer"

SOME FACTS AND FIGURES ON ACTIVITIES AT THE SOCIETY HEADQUARTERS

At a time when the membership of the Society is taking an unusually active interest in its policies and the administration of its affairs, it is believed that some statement regarding finances, and a description of how the business of the Society is conducted, will be of interest. Based on the experience of many years past it is found that the ratio of the total income of the Society in dollars to the total number of members, including all grades, is approximately 20. This means that the annual income of the Society per member is approximately $20.

The following tabulation gives a distribution of the several items of income for 1919; it is followed by "Expenditures," showing how the money is disbursed. In each case, the amount per member is included, based on the average membership of 9 089 for the year.

INCOME FOR 1919.

	Total.	Per Member.
Initiation fees	$18 455	$2.03
Dues	138 817	15.27
Annual Meeting	2 070	0.23
Sale of publications	3 234	0.36
Bank interest	765	0.08
Badges, binding, and certificates	10 739	1.18
Compounded dues	1 250	0.13
Rent of 57th Street Building	6 060	0.67
	$181 390	$19.95

EXPENDITURES FOR 1919.

	Total.	Per Member.
Salaries of Officers	$15 705	$1.73
Clerical help	27 009	2.97
Publications	36 830	4.05
Postage	9 000	0.99
General printing	7 440	0.82
Office supplies and furniture	3 018	0.33
United Engineering Society (including rent of offices in the Engineering Societies Building; Engineering Council; etc.)	20 545	2.26
Mileage and work of Committees	16 132	1.77
Annual Meeting and Convention	4 117	0.45
Interest and insurance	10 332	1.13
Alteration to 57th Street Building	18 648	2.00
Miscellaneous (Badges, Certificates, Binding, Reading Room, Prizes, Refund of Dues, Delegation to France, etc.)	16 644	1.83
	$185 420	$20.33

All that precedes is based on provisions of the Constitution regarding dues as they existed before the passage of the amendment to Article IV, which becomes

effective on November 5th, 1920, and which will increase the dues of all Non-Resident Corporate Members $5 each beginning January 1st, 1921, and the probable effect of which will be to increase the income per member from $20 to $23.

The Secretary's staff consists of a total of twenty-three employees, distributed as follows: An Editor, an Editorial Assistant, a Chief Office Assistant, three Reading Room Assistants, twelve stenographers and clerks, two bookkeepers, a mailing clerk, and two office boys.

The executive office of the Secretary is the center of the Society's Headquarters. Here all mail is received and distributed. Frequently more than a thousand pieces (exclusive of periodical matter) are received in one day, including ballots which require special handling. All other mail is read with care and distributed to the particular Department concerned. Special files of correspondence and all data requiring action by the Board of Direction, by Committees, or by the Secretary, are maintained. Many visitors who desire to see the Secretary personally are received here. Data are prepared and scheduled for consideration at Board and Committee meetings, and the minutes of the meetings are written under the personal supervision of the Secretary and the Chief Office Assistant. All conferences and committee meetings are held in the Board Room adjoining the Secretary's office.

The work of the general office is under the supervision of the Chief Office Assistant. The office is divided into departments, but owing to their close interrelation it is difficult to describe their separate functions.

The Reading Room.

The Reading Room is open from 9 A. M. to 10 P. M. The Reading Room Assistants, in addition to their duties at the desk (answering inquiries, attending to visitors' mail, etc.), prepare the Current Technical List of Engineering Literature formerly published in *Proceedings* but now issued in pamphlet form, and have entire charge of all orders for membership certificates and of the requests for papers and discussions, synopses of which are published in *Proceedings*. The general office letter file, also, is in charge of one of the Reading Room Assistants.

The inquiries received in this room are many and varied. They generally pertain to publications and library research, but many are of the general character that suggest the need of an Information Bureau at the main entrance to the Engineering Societies Building. They are all given careful attention; here are a few samples:

"What is the length of Queensboro Bridge? of the Brooklyn Bridge?"

"What papers have been published on Concrete Dams?"

"What is the best hotel to stop at?"

"Where shall I eat?"

"What is the quickest way to get to the Hudson Terminal Building?"

"In what periodical between 1908 and the present time was there published an article on 'Beginnings of Reinforced Concrete'?"

"Parlez vous Francais?"

The attendance in the Reading Room averages twenty each day.

In the Stenographic Department about 30 000 letters and 33 000 forms are written yearly. Much manuscript is copied. All mimeographed material is sten-

oiled and the services of the stenographers are often enlisted to help in the mailing of circulars, questionnaires, etc., an unusually large number of which have been issued during recent months. All bills, receipts, and much other mail matter are addressed in this Department, and many other clerical details receive attention.

Operations Required to Record Change of Address.

The receipt from a member of a request for a change of address entails not less than twenty-four distinct operations. It may be interesting to describe the principal features of the routine involved:

A change is first made on the member's card in the main file; it is then made on his card in a second file, the two cards are then compared and any discrepancies corrected; then in addition to the two sets of cards there is a file of stencils which is used for the mailing of all publications and circular matter. These stencils are arranged according to the geographical districts and separated into Corporate and Non-Corporate Members, in alphabetical order. A list is made of all changes received during each day, on which must be marked the number of the district in which a member formerly resided in order that the stencil may be located. From these lists, new stencils are cut and checked with the membership card, marked with the number of the new district and refiled. This makes necessary not only the writing of the member's name and new address but also a mark which indicates the kind of binding he desires for *Transactions*. After the required changes are made, a letter is written to each member informing him that his request has been complied with.

In many cases the member fails to notify the Secretary of his change of address, and it is only through a notice received from the Post Office that the office becomes aware of the change. This means that a membership card must be marked to show that mail can no longer be delivered to the member's old address, and a stencil must be marked in a similar way. A letter is then written calling attention to the neglect to send notice of change of address.

A member occasionally requests that his title and address be so entered that letters may be sent to one address and publications to another. Great care must be exercised in the entries of all addresses, since any mistake may cause the loss of the Society publications.

During the month of September alone of the current year 33 000 envelopes and 3 450 postal cards were addressed from the stencils.

Preparing Records of Applications.

The work of preparing the records of applicants for admission or transfer, and publishing them in the "Preliminary Notice of Applications for Admission and for Transfer", issued eight times per year, calls for especial skill in the detail required, together with a considerable knowledge of engineering terminology. In addition to the preparation of preliminary lists, a questionnaire must be mailed to each member offered as a reference by the applicant for admission or for transfer, as well as to many of his present or previous employers.

An examination of Table 1 will disclose a considerable increase within the past few years of applications for admission and for transfer to higher grades. Table 2 in a similar manner indicates the number of candidates actually balloted upon.

It should be explained that the difference between the number of applicants and the number balloted upon in any given year does not represent the number declined after investigation, since no ballot is issued covering transfers from the grade of Associate Member to that of Member.

TABLE 1.—Number of Applicants for Admission and Transfer.

Month.	1914	1915	1916	1917	1918	1919	1920
January	101	87	160	121	109	129	172
February	92	....	114	147	117	137	180
March	107	150	101	80	98	102	172
April	118	....	117	124	79	144	....
May	102	173	....	....	....	....	157
June	....	....	....	....	....	....	....
July	150	127	161	224	136	226	182
August	74	....	72	70	68	136	....
September	58	100	....	....	....	....	211
October	88	....	105	93	125	152	....
November	73	122	103	105	87	105	....
December	55	....	....	....	....	....	....
Total	1013	759	933	964	814	1131	1074*

TABLE 2.—Number of Applicants on Ballot Lists.

Month.	1914	1915	1916	1917	1918	1919	1920
January	59	76	25	83	71	86	115
February	69	47	....	....	....	....	....
March	47	15	107	103	86	81	99
April	63	102	78	71	77	74	107
May	85	....	111	108	81	93	....
June	100	75	61	66	72	97	141
July	....	....	....	....	....	....	146
September	114	151	118	119	82	125	106
October	68	....	87	104	74	137	126
November	61	56	117	125	85	129	....
December	62	89	....	....	....	....	....
Total	728	611	704	779	628	822	840*

* Total on lists published (two more to be issued in 1920).

During the last year the Preliminary Lists contained 330 000 words.

All the financial records of the Society are kept by a double entry system of bookkeeping. This necessitates: (*a*) the daily posting of collections through the Cash Book (averaging 800 entries per month, aggregating approximately $18 000; (*b*) a Ledger Card for each individual member, kept up to date so that the standing of any member from the time he joins the Society can instantly be obtained; (*c*) a monthly Trial Balance; (*d*) a General Ledger, a daily Charge Book, a Disbursement Book, and several minor books. These entries must all be quickly made in order to be of value.

During the past year 18 000 bills have been sent out by this Department.

The Mailing Department handles an average of 300 pieces per day, exclusive of routine matter, such as the "Preliminary Notice of Applications for Admission and for Transfer", *Proceedings*, etc. The envelopes for the latter are addressed by means of the stencils to which previous reference has been made. Although it

requires but eight hours to address envelopes for *Proceedings,* it takes three days after they are addressed to arrange them in accordance with Post Office regulations.

As an example of the ability of the office to put through a rush order, the issuance of the Questionnaire on membership in the Federated American Engineering Societies, may be cited. This consisted of five items, as follows:

Constitution of the Federated American Engineering Societies (16-page pamphlet); a pamphlet containing the arguments for and arguments against (8 pages); a reply form, and two envelopes.

The arguments were not received, complete, until after office hours Saturday, September 18th, copy went to the printer on Monday morning, the 20th, and the whole matter was mailed to all the 9 000 Corporate Members of the Society on Thursday, September 23d. Such work requires not only speed in the Editorial and Mailing Departments, but cordial and intelligent co-operation on the part of the printer. The physical work in a shipment of this kind is heavy. Simply to place the material in the envelopes required 63 000 motions.

The Editorial Department.

The Editorial Department now consists of an Editor and one Editorial Assistant to prepare all the manuscript for Society Affairs published in *Proceedings,* papers, discussions, memoirs, circulars, and miscellaneous matter published by the Society. In addition to the editing of manuscript, this Department must arrange for reproduction by means of wax cuts, zinc cuts or half tones, of all diagrams, illustrations, and photographs received with the papers and discussions. This Department is charged with the preparation of memoirs of deceased members, the keeping of records of costs of publications, indexes to *Proceedings* and *Transactions.* In addition, papers and discussions are edited for final publication in *Transactions.* Some idea of the amount of editorial work involved may be gained from the fact that in 1919 a total of 2 068 pages was printed in *Proceedings,* which involved the editing of at least 4 000 pages of typewritten manuscript. In 1920, up to and including September, 2 075 printed pages have been issued in *Proceedings,* pamphlets, etc. Inasmuch as the publication of *Transactions* was omitted in 1919, the next volume now in course of preparation will contain over 2 300 pages.

Except the writing of the copy, which is done in the General Office, the publication of the Year Book is included in the work of the Editorial Department, in charge of the Editorial Assistant. The Year Book for 1920 contained 365 pages, 9 373 names in the principal list of members, together with a Geographical List, a list of Past and Present Officers, and the names of all deceased members, in addition to the Constitution, general information, names of Committees, etc. The preparation of this material includes keeping records of additions to and deductions from membership, changes of address, printing records, proof-reading, and careful checking.

It is evident from the foregoing that the item for publications, $4.05 per member last year when no volume of *Transactions* was issued, covers a most important activity of the Society. This item will be much larger for 1920, due to the unusual increase in costs of printing and the cost of publication of the next volume of *Transactions.*

ITEMS OF INTEREST

The Committee on Publications will be glad to receive communications of general interest to the Society, and will consider them for publication in *Proceedings* in "Items of Interest". This is intended to cover letters or suggestions from our membership concerning matters which are not of a technical character. Such communications, however, must not be controversial or commercial.

NATIONAL SERVICE DEPARTMENT OF ENGINEERING COUNCIL

In response to frequent expression of need, Engineering Council announces the establishment of a National Legislative and Departmental Information Service for engineers in all branches of the Profession. Information relative to engineering statistics, research, and construction, as well as of matters before Congress involving engineering considerations, will be furnished without charge by addressing M. O. Leighton, National Service Representative of Engineering Council, 502 McLachlen Building, Washington, D. C. This National Service Department of Engineering Council announces that its office at Washington is open to members of the Society at all times, and that accommodations can be had there at short notice for committee meetings of the Society, or of any organization in which the Society is interested, which may be held in Washington.

Testimony of Herbert Hoover Before United States Senate Committee on Reconstruction and Production

At a hearing held in New York City, at the Engineering Societies Building, on September 23d, 1920, by the Special Committee on Reconstruction and Production of the United States Senate*, Senator Calder, of New York, Chairman, the subject of Postal Savings Banks was considered, Herbert Hoover, M. Am. Soc. C. E. and President, Am. Inst. M. E., being the principal witness.

In reply to questions by Senator Calder, Mr. Hoover brought out the fact that, although the Postal Savings Banks were originally established for the purpose of enlarging the area of National savings, the examination of the Annual Report will show, for instance, that in 1918 the average deposits were approximately $128 000 000, and the interest paid to depositors only $1 259 000—or about 1 per cent. He stated that the system was subject to criticism for this low return, as the original Act specified 2% return. He believed that the aggregate of National savings would be stimulated if the Government itself was satisfied with less than the 100% profit on investment apparently indicated by the figures for 1918, and if it paid something like an adequate rate of interest to depositors.

Mr. Hoover stated that the first thing to do was to pay interest at the rate of ½% quarterly on average deposits—not only as a matter of justice, but because it is an implication of the law (2% per annum). The second step would be the declaration yearly in advance of an additional rate to be paid upon deposits of twelve months' duration. In reply to a question by Mr. Eugene Meyer, Assistant to the Committee, as to whether a rate of 6% would be too high for Postal Savings

* *Proceedings*, Am. Soc. C. E., August, 1920, p. 584.

Banks to offer, Mr. Hoover stated that he thought probably no situation would arise to require such a high rate, since the present high rate of interest on Government securities is temporary, and because the deposits in Postal Savings Banks are demand deposits. He felt that if the Government paid such high rates on Postal Savings as would result in the removal of deposits from the commercial banks, there would be no intrinsic gain, with perhaps some difficulties. On the other hand, it would be a great economic gain to the entire country, both from a financial and economic point of view, if the Postal Savings system actually created new savings. Such a reasonable rate should be offered as would form a sound basis for propaganda and educational work on the importance of saving.

In reply to a question by Mr. Meyer in reference to the mining labor conditions, Mr. Hoover stated that there were thousands of places in the United States that have absolutely no banking facilities—small communities like mining camps and industries located in the country; he felt that if an adequate rate were offered there would be a great expansion in the number of Post Offices that would establish Postal Savings facilities, and that there should be a drive to extend penetration to such outlying areas. This would have the great economical advantage of not competing with the normal banking system of the country, but would gather in more savings.

Senator Calder, referring to the lack of Savings Bank facilities in mining camps and the out-of-the-way places of the country, also the disinclination of the foreigner to use our banking system, asked whether there is, in this country to-day, very much money held out of circulation by being put away in stockings and on shelves. Mr. Hoover stated that he had not made any calculation of such invisible currency, but understood it to be considerably larger now than before the war. He believed, however, that the greatest value in the proposed increase of the Postal Savings rate to be in the actual encouragement of saving and the prevention of waste and extravagance. Larger proportions of new deposits would probably come in this way than from drawing out actual currency now hoarded in the homes, although the latter item might be considerable. Asked whether in his experience the miners carried much money with them, Mr. Hoover replied that they did so, although often depositing it at the saloons in the old days, making actual deposits with the saloon-keeper.

War Loss to Transportation and Building

Senator Calder raised the question as to the general condition of the plant of the country and asked Mr. Hoover whether, as an engineer, he felt that in order to increase production we must first increase our tools of production. Mr. Hoover replied that almost every engineer interested in these problems in a broad way, is faced with that general fact—that to increase production we must increase the tools of production—and the tools of production are increased out of the savings of the Nation, thus coming back to the old problem of thrift. By improvement in the tools of production, the cost of production is constantly reduced; that improvement must take place out of capital investment; and capital investment must, in turn, represent the savings. By the improvement of plant, he said, the vital need for the advancement of the entire Nation would be met; that is, to increase the number of commodities available for the total population—in other

words, to raise the standard of living. Through that process, by decrease in the cost of production, improvement in the tools of production and improvement in labor, we can go on making the constant advance which this country has seen more than any other country in the world.

During the war, Mr. Hoover pointed out, by force of circumstances and by Government action, the current of expansion of the tools of industry was entirely changed. In order to provide the materials consumed in war, transportation and building were sacrificed. Those two industries suffered most, they have lagged behind, until to-day they are in a most acute situation. The materials consumed in the war were produced at the net loss of transportation and building.

Senator Calder raised the question whether construction work is handicapped by the varying building codes of uncertain character in the various cities, but Mr. Hoover stated that he had not given that question much attention, although he felt that the situation was one that really demanded immediate and extensive inquiry on a National scale. He felt that the diversion of building trade labor and materials for war purposes, and the growth of population which has, in itself, made a demand for a million more houses since the war began, was the prime cause of the lagging behind in all parts of the country which had produced a situation very acute in the cities. To a question by Senator Calder whether it would be possible to redraft the building codes in order to cut down the cost of building construction a great deal, Mr. Hoover replied that it would certainly be of assistance if there was more uniformity all over the country in these matters.

Mr. Hoover stated that the economic effect of the excess profits tax, more especially on the industries involving around the extension of the National plant and equipment, is all wrong and is most serious in results. The excess profits tax is not a tax on profits; it is a method of collecting taxes from the consumer through the manufacturing and business functions of the country; when a tax of that kind is passed on to the cost of buildings, a permanent charge is laid on the country with respect to its plant and equipment.

Mr. Meyer pointed out that the French Government had to pay 9½% at the time it had a loan of $250 000 000 falling due, and was able to obtain only 40% of the loan even at that rate, showing a dearth of capital not only for our own needs but in order to furnish any help to Europe. Mr. Hoover then stated that such foreign requirements also enter into the economic situation in this country due to the foreign competition with the capital requirements for money here; in their desperate situation they are bidding up the rate of interest, and the only solution for that situation is increased savings all over the world.

Railroad and Water Transportation

Mr. Hoover stated that the railway transportation in this country is totally inadequate, and that this problem should be treated for the country as a whole, both rail and water transportation. One problem that New York State has is to secure the great relief that would be afforded by a more rapid completion of the Erie Canal. That canal is handling only 1 000 000 tons of freight to-day; it should handle 10 000 000 tons. One of the prime difficulties in the transportation situation is the congestion of the Allegheny Gateways. The Erie Canal is a direct relief to that neck of the bottle; and it would be, if it were put into adequate

operation, a great benefit to the whole building situation in New York, as it would open up the Great Lakes for direct contact with the city.

Senator Calder stated that the Committee had found, during its investigation, that there is to-day less freight going through the Erie Canal than there was in the "mule-drawn days" thirty or forty years ago; in face of the fact that the State has spent over $130 000 000 for a great waterway free to anybody who wants to use it, business men have apparently not attempted to use it to any great extent. Mr. Hoover explained this difficulty as being due to the fact that the Canal was designed for 12½ ft. draft, and it has not reached that depth throughout its length. No one is going to build barges for 8½ ft. depth when there is a prospect of 12½ ft., so that the construction of barges is held off pending the assurance of the completion of the Canal. This whole canal question is of enormous importance in view of the increase in railroad rates, which means a definite increase in the cost of food in New York, as well as raw materials, if the Canal cannot quickly be completed for operation on a large scale; it needs terminal facilities as well as the completion of full depth throughout its length; and, of course, one of the problems of New York City is lack of terminals in its food distribution.

Mr. Hoover Objects to Exemptions from Income Tax

In reply to a question by Senator Calder, Mr. Hoover stated that he objected to any relief from the income tax, because it is one of the most just and efficient methods of taxation; he would even go so far as to try to devise methods to overcome the handicap of present tax-exempt securities. He would rather see something on the order of Farm Loan Bank facilities extended to home builders, than to infringe on the income tax system as proposed in the suggestion that the New York State Legislature should pass a bill to exempt mortgages on real estate from the State income tax. Senator Calder then mentioned the fact that he had introduced a bill to provide for the establishment of a home loan banking system somewhat in line with the Farm Loan system.

Mr. Hoover felt that the whole country is demanding the abolition of the excess profits tax, that he would like to see a National commission called to consider the whole housing question. It is just as acute elsewhere as it is in New York City, and if each city attempts to solve it by methods of its own, competition between cities may be created that, due to a shortage of material and shortage of labor, will defeat their objects. Senator Calder then pointed out that the Committee had held hearings in Baltimore, Philadelphia and Boston and would, in a course of a few weeks, hold hearings in some of the Western cities. It had organized in several large centers, whereby men interested in the building material situation and in building construction are co-operating with the representatives of the railroads. Mr. Hoover approved as constructive this work of the Committee, which Senator Calder stated had resulted in getting a great deal of building materials through for immediate use.

Replying to a question by Mr. F. T. Miller, Assistant to the Committee, as to the need of a definite programme for the direction of capital and labor, Mr. Hoover said that he believed such a programme to be necessary, and that such agencies as the Federal Reserve Bank, in its influence over the direction in which capital flows, might exert much greater pressure than it has done. If such a programme

could be announced, the Federal Reserve Bank would be guided by it in the practical application of capital to necessary, as against non-essential, activities.

In conclusion, Mr. Hoover suggested that if the Committee's powers of inquiry are wide enough, it should investigate the question of the reconstruction of the departments of the Federal Government. He believed this to be one of the most immediate problems because of the existing antiquated organization and administration therein—the worst to be found in any kind of activity in the United States—which is anything but a credit to the skill and intelligence of the American people. There is a tremendous saving possible as this situation, which is the result of a hundred years of growth of a poor administrative organism—experienced in a most vivid manner by the terrible weaknesses shown during the World War. Senator Calder thanked Mr. Hoover for the suggestion and said the Committee would see if the authorizing resolution would permit carrying it into effect.

Engineering Foundation's Work and Needs

Necessity for more, and better, and continuing research in the engineering field, and the benefits to be derived therefrom, are generally admitted. Research pays, but in some cases not so immediately that an individual or a company of moderate resources can undertake it. Material needs created by advancing standards of living must be met largely by progress in the sciences and in engineering and other branches of technology. For six years there has existed an organization created by the Founder Societies to stimulate and oversee research for engineers.

Engineering Foundation, based on a trust fund established by United Engineering Society from gifts of Ambrose Swasey and other donors, is the central research organization for the Engineering Profession. With an income of $10 000 for three years and $15 000 for three years, Engineering Foundation has:

1.—Aided in establishing National Research Council and in supporting its Division of Engineering.

2.—Financed an investigation of fatigue phenomena of metals, now in progress, in which a leading industrial corporation has recently joined, making a large financial contribution.

3.—Financed a hydraulic research which resulted in an improved weir, with a straight-line formula.

4.—Participated in a study of spray camouflage of ships.

5.—Supported a study in mental hygiene of industry.

6.—Compiled for National Research Council a classified directory of industrial research laboratories in the United States.

7.—Financed tests of wear of gears, now in progress.

8.—Investigated the practicability of a testing station for large water wheels and other large hydraulic equipment.

Numerous large and important research projects which promised valuable results could not be undertaken because of lack of funds. Enterprising corporations are each spending hundreds of thousands, and, in several cases, millions of dollars every year for research in their restricted fields of industry. Engineering Foundation desires to serve the Nation and the Engineering Profession adequately, but to do so must have adequate resources. It renders full account of its funds, and

reports the work done. It seeks increase of its endowment. It has $300 000, with assurance of $250 000 more. The first million should be rounded out this year and other millions should follow. A gift for research is a productive investment.

Pecuniary gains from research go most directly to the industries; therefore the industries, with which thousands of engineers are connected, should contribute to the support of engineering research. Gifts of $1 000 or more are desired. Those who cannot themselves contribute are urged to make a real effort to interest men who can. Each person giving $250 000 or more will be honored as a Founder.

Foundation's Relation to Other Agencies

Engineering Foundation's relations to other agencies are as follows:

The Foundation is really a trust fund owned by United Engineering Society for its four Founder Societies. The income of this fund is used "for the furtherance of research in science and engineering or for the advancement in any manner of the Profession of Engineering and the good of mankind". This is accomplished through activities as a joint agency with the Engineering Division of National Research Council, by co-operation in stimulating and co-ordinating research through governmental, educational, industrial, and private agencies. Engineering Foundation may undertake any kind of work which the Division may undertake, as well as other research. Even in their common field there is work enough for both; by agreement upon programme from time to time, interference is avoided.

The peculiar value of the Engineering Division* arises from its being an integral part of National Research Council, which is the National federation of scientists and engineers for promotion of research, making it possible to place before scientists engineering problems requiring scientific research, and to inform engineers of activities of scientists which may affect engineering. Engineering Foundation contributes to the support of the Division, shares in its deliberations through interlocking membership, benefits from its work, and has its advice as to researches which may profitably be supported by the Foundation. Independently, the Foundation may establish and maintain laboratories, support or conduct researches, and contribute results to the engineering societies.

In its relation to the scientific governmental bureaus, the Foundation acts to exchange information, make more available to engineers the results of researches by the bureaus, and suggests to the bureaus how to make their researches more helpful.

The Foundation co-operates with consulting and industrial laboratories to make available to them the results of research by the Foundation and other agencies, and to obtain for general use the results of the researches of these laboratories.

The Foundation aids in making the Engineering Societies Library the repository of all information about research relative to engineering.

Engineering Foundation can supply direction and support of research, relative to engineering, of such nature as cannot well be undertaken by an industrial corporation, the Government, nor a university. It can collect and publish information about research of particular interest to engineers, utilizing engineering journals.

* See *Proceedings*, Am. Soc. C. E., August, 1920, p. 579.

In order to enlarge its usefulness, Engineering Foundation should establish an Engineering Research Institute and Laboratory. This Laboratory could be used to supplement the university training of promising research men, to provide place and means for research by engineers and inventors, and for limited co-operative research for industries. The Laboratory might be made partly self-sustaining. For some kinds of work or training, charges might be made, particularly for those not of general interest, and for those from which profits will be realized. Such an establishment under Engineering Foundation would have an independence and celerity of action not feasible in a governmental laboratory, and would be able to conduct researches on a scale and in an atmosphere of practical requirements not possible in a university.

A booklet about Engineering Foundation and further information will be sent upon request by Charles F. Rand, Chairman, 71 Broadway, New York City, or Alfred D. Flinn, Secretary, 29 West 39th Street, New York City.

Joint Committee on Standard Specifications for Concrete and Reinforced Concrete

The Joint Committee on Standard Specifications for Concrete and Reinforced Concrete consists of five representatives from each of the following: American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering Association, American Concrete Institute, and the Portland Cement Association. It is charged with the preparation of specifications for concrete and reinforced concrete and will use as a basis the report of the former Joint Committee, with such modifications as are necessary to make its recommendations agree with current practice.

This Committee is thus the successor of the Joint Committee on Concrete and Reinforced Concrete which was organized in 1904 through the co-operation of all the foregoing Societies, except the American Concrete Institute, whose co-operation began in 1915. The latter Committee presented progress reports in 1909 and 1912 and adopted the final report* to its constituent Societies on July 1st, 1916. In presenting its final report, it said: "The report is not a specification, but may be used as a basis for specifications."

The present Joint Committee, therefore, will undertake to complete this work by preparing standard specifications based upon the recommendations of the old Joint Committee. The initiative in bringing about the present Joint Committee was taken by the Committee on Reinforced Concrete of the American Society for Testing Materials at a meeting on June 27th, 1917, but it was not until November 22d, 1919, that all of the Societies had accepted the invitation and appointed representatives.

The personnel of the Joint Committee is as follows:

Representing the American Society of Civil Engineers: Rudolph P. Miller, Chairman, William K. Hatt, W. A. Slater, A. E. Lindau, and Sanford E. Thompson.

Representing the American Society for Testing Materials: Richard L. Humphrey, Chairman, Leon S. Moisseiff, Albert T. Goldbeck, Henry H. Quimby, and Edward E. Hughes.

* *Transactions*, Am. Soc. C. E., Vol. LXXXI, p. 1101.

Representing the American Railway Engineering Association: J. J. Yates, Chairman, George E. Boyd, C. C. Westfall, Frederick E. Schall, and H. T. Welty.

Representing the American Concrete Institute: S. C. Hollister, Chairman, Robert W. Lesley, E. J. Moore, Arthur R. Lord, and Leonard C. Wason.

Representing the Portland Cement Association: Frederick W. Kelly, Chairman, Ernest Ashton, Edward D. Boyer, J. H. Libberton, and Duff A. Abrams.

The Committee perfected a permanent organization on February 11th, 1920, with the following officers: Chairman, Richard L. Humphrey; Vice-Chairman, J. J. Yates; Secretary-Treasurer, Duff A. Abrams; and an Executive Committee consisting of these officers and Messrs. Rudolph P. Miller and S. C. Hollister. The Committee adopted By-Laws and apportioned the work of preparing a tentative draft of a specification among the following Sub-Committees:

1.—Materials (other than Reinforcing): Albert T. Goldbeck, Chairman, and Messrs. Abrams, Libberton, Thompson, and Yates.

2.—Metal Reinforcement: J. J. Yates, Chairman, and Messrs. Hughes and Lindau.

3.—Proportioning and Mixing: W. A. Slater, Chairman, and Messrs. Abrams, Ashton, Boyd, and Quimby.

4.—Forms and Placing: George E. Boyd, Chairman, and Messrs. Boyer, Moore, Schall, and Wason.

5.—Design: S. C. Hollister, Chairman, and Messrs. Hatt, Lindau, Lord, Moore, Slater, and Welty.

6.—Details of Construction and Fire-proofing: Rudolph P. Miller, Chairman, and Messrs. Hatt, Lord, Moisseiff, and Westfall.

7.—Waterproofing and Protective Treatment: Frederick W. Kelly, Chairman, and Messrs. Goldbeck, Hollister, Lesley, and Westfall.

8.—Surface Finish: Henry H. Quimby, Chairman, and Messrs. Boyer, Libberton, Wason, and Welty.

9.—Form of Specification: Richard L. Humphrey, Chairman, and Messrs. Abrams, Boyd, Hollister, Goldbeck, Kelly, Miller, Quimby, Slater, and Yates.

The Committee instructed these Sub-Committees to send progress reports to the Secretary-Treasurer on or before May 15th, 1920, and adjourned to meet at Asbury Park, N. J., during the Annual Meeting of the American Society for Testing Materials, June 22d-25th, 1920.

Second Meeting of the Committee.

The second meeting of the Joint Committee was held on June 22d, 1920, at the New Monterey Hotel, Asbury Park, N. J., Richard L. Humphrey in the chair, with 17 members present.

The report of Sub-Committee No. 1, on Materials (other than Reinforcing) was presented by Mr. Goldbeck, following which there was a general discussion of the subject of specifications in the Joint Committee's report. Mr. Lesley moved that where a specification is referred to, it shall be appended to and made a part of the Joint Committee specification; this was duly seconded and carried. Mr. Yates moved that specifications be printed in appendices with a foot-note giving the history of the adoption of the specification; this was also seconded and carried,

as was a motion by Mr. Goldbeck that in drawing specifications it is desirable to base them on conservative practice.

Mr. Hollister moved that the word "specification" be considered to be a tentative specification covering the full activities of the Sub-Committee, and that it not be considered final unless so recommended by the Sub-Committee reporting; this motion was carried. It was the sense of the meeting that Sub-Committee No. 1 should co-operate with Sub-Committee No. 6, on Details of Construction and Fire-proofing, with a view to defining desirable properties of concrete for structural purposes.

The report of Sub-Committee No. 2, on Metal Reinforcement, was presented by Mr. Yates, and there was a general discussion of the following:

1.—Relative merits of billet steel bars, bars re-rolled from old rails, and hot and cold twisted bars.

2.—Standardizing of sizes of reinforcing bars.

3.—Limits in the bending of reinforcing bars.

The report of Sub-Committee No. 3, on Proportioning and Mixing, was presented by Mr. Slater. The work of this Sub-Committee will be taken up under the following sub-headings:

1.—Definitions.
2.—Units of measure.
3.—Requirements of concrete.
4.—Basis of proportioning concrete.
5.—Relative economy of different mixtures.
6.—Quantities of materials required for a unit volume of concrete.
7.—Inspection.
8.—Mixing concrete.
9.—Retempered concrete.

The Chairman of the Sub-Committee presented a tentative report on control tests of the quality of concrete during construction.

Mr. Hollister presented the following resolution:

"That it be made a part of the policy and programme of the Joint Committee on Specifications for Concrete and Reinforced Concrete to draw its conclusions only in the light of all available test data and experience, and to reinforce its reports by publishing simultaneously a digest of the principal test data and of the principal facts of experience on which the specific provisions adopted in the reports are based, together with a list of references to other data consulted, but which are not believed to be of sufficient importance in connection with such reports to warrant the work of preparing a digest."

Sub-Committee No. 5, on Design, held three meetings at Asbury Park prior to this session of the Joint Committee at which the following topics were considered:

1.—Shear in reinforced concrete beams.
2.—Reinforced concrete floor slabs.
3.—Columns and footings.
4.—Slabs supported on four sides.
5.—Shrinkage and temperature changes.
6.—Retaining walls.
7.—Mass concrete.
8.—Factors of safety.

Mr. Hollister stated that Committee C-2, on Reinforced Concrete, of the American Society for Testing Materials, had formally volunteered its aid in carrying out the work of this Sub-Committee. On motion, the Joint Committee expressed its thanks and appreciation for the offer of assistance from Committee

C-2, and Sub-Committee No. 5 was authorized to confer with representatives of Committee C-2 as to methods of co-operation in carrying out the work of the two committees.

AFTERNOON SESSION.

At the afternoon session, with 15 members present, the report of Sub-Committee No. 7, on Water-proofing and Protective Treatment, was presented by Mr. Kelly, Chairman, who read the tentative draft of the report of the Sub-Committee covering such topics as were referred to in the 1916 Joint Committee report, which included an extensive bibliography on water-proofing of concrete and protective coatings. Additional bibliographies will be prepared on the following subjects:

1.—Effect of sea water on concrete.
2.—Effect of alkali on concrete.
3.—Permeability of concrete.

After discussion, the Sub-Committee was instructed to bring in specifications for the membrane method of water-proofing, and was authorized to get in touch with the American Society for Testing Materials representatives on the Committee with reference to data on water-proofing which may be supplied by that Society.

No formal report was presented by Sub-Committee No. 8, on Surface Finish; Mr. Hollister moved that this Sub-Committee present complete specifications on all methods of surface finish on which it is prepared to report, and the motion was duly seconded and carried. Mr. Kelly moved that the words "poured" and "flushed" be avoided in specifications prepared by the Joint Committee; the motion carried. The attention of the Sub-Committee was directed to the subject of floor finish, which was to be considered a part of its work, and Mr. Lindau moved that it be requested to bring in a specification for floor finish; this motion also carried.

It was moved, seconded and carried that Sub-Committee No. 3, on Proportioning and Mixing, be requested to prepare a definition of concrete.

EVENING SESSION.

At the evening session, with 13 members present, the report of Sub-Committee No. 6, on Details of Construction and Fire-proofing, was presented by Mr. Miller, and this Sub-Committee was directed to confer with Sub-Committee No. 5, on Design, with reference to certain details of its work.

After a general discussion of the date of the next meeting of the Joint Committee, it was voted to meet in the Engineering Societies Building, New York City, on October 26th, 1920. It was the sense of the members present that three days will probably be required for the work of the October meeting.

Following the evening session, Mr. Slater presented an illustrated lecture on experimental studies of shear in deep reinforced concrete beams, which were carried out by the U. S. Bureau of Standards and the Shipping Board. Several visitors from the American Society for Testing Materials were present.

Architects Advocate Housing as a Public Utility

The Philadelphia Chapter of the American Institute of Architects, a body to which no taint of radicalism has ever attached, has lately declared that houses for

those who earn low wages can no longer be built anywhere in the world at a cost which will permit them to be either sold or rented without loss, and that "it is unquestionably true that an industrial system, or even any particular industry, which fails to make possible adequate shelter, food, clothing, and recreation for all of its operatives is unworthy to exist."

The Chapter proposes "that housing for those earning low wages or salaries be legalized as a public utility; that the manufacture of this class of homes as a profitable industry should cease in theory as it has already ceased in fact; and that the government, National and local, should at once adopt measures making possible the supply of this prime necessity of life."

ACTIVITIES OF ENGINEERING COUNCIL

Meeting of Joint Committee on Licensing Engineers and Architects

At a meeting on September 15th, 1920, of the Joint Committee of the American Institute of Architects and of Engineering Council, F. C. Shenehon, M. Am. Soc. C. E., Chairman, an extensive discussion of the subject of the registration of engineers and architects resulted in the unanimous approval of the following resolution:

"*Whereas:* Members of the architectural and engineering and other professions in various sections of the country are urging the enactment of State laws providing for registration or licensing,

"*Be it Resolved:* That the Joint Committee of the American Institute of Architects and Engineering Council is of the opinion that the many points of contact between the architectural and engineering professions make it desirable for them to favor the passage of joint registration laws. In those States in which there already exists a Department of Education and Registration or other similar department, as in the cases of New York, Illinois and Idaho, it is desirable that registration laws should be administered by such State departments with the aid of professional commissions in each Profession. Where such State departments do not exist, their formation should be encouraged. A joint registration law for architects and engineers should be designed to protect the title of architect or engineer and to assure the public that a person using that title is properly qualified.

"Examinations for registration should in all cases be conducted only by members of the professions affected; that is, for architectural registration the examining board should be composed of architects and for engineering registration, of engineers.

"*Be it Further Resolved:* That no registration or licensing act should deprive any person who, prior to the passage of the act, was engaged in the bona fide practice of his Profession, of the right to continue, but he should not be entitled to the use of the title 'Registered Architect' or 'Engineer' unless he shall have satisfied the Board of his competency and received a certificate of registration; and that any person desiring to begin the practice of architecture or engineering after the act goes into effect shall be required to establish his competency before the Board in order to entitle him to the use of the terms 'Architect' or 'Engineer'."

Membership in American Engineering Council

The matter of the American Institute of Architects joining Engineering Council or the new American Engineering Council was then discussed, and the following resolution was proposed, seconded, and unanimously carried:

"Whereas: The American Institute of Architects Committee on Co-operation with Engineering Council recommended to the American Institute of Architects at its convention in Washington held in May, 1920, the advisability of the Institute becoming a member of the Engineering Council and that Convention accepted the recommendation of its Committee,

"Therefore be it Resolved: That the Joint Committee is of the opinion that the American Institute of Architects should join the American Engineering Council as soon as the Institute deems it practicable to do so."

Abstracts of Existing Engineers' License Laws

The following abstracts of Engineering Council's recommended model law* for registration of professional engineers, architects and land surveyors, and of the laws now in effect in the eleven States of Colorado, Florida, Idaho, Illinois, Iowa, Louisiana, Michigan, New York, Oregon, Virginia, and Wyoming, have been prepared in the office of Engineering Council and are here reproduced as of interest to the membership in connection with proposals for engineers' license laws in other States and in view of the agitation for a uniform law for all States. The legal accuracy of these abstracts is not guaranteed by Engineering Council.

ENGINEERING COUNCIL'S RECOMMENDED MODEL LAW.

Proposed by Committee in December, 1919.

Administration.—Board of Registration, consisting of seven members appointed by the Governor. At least three members shall be professional engineers and at least three shall be architects.

Application for Certificate.—Made to Board of Registration.

Definitions.—Not given for architecture and professional engineering; land surveying as covered by this Act refers only to surveys for the determination of areas or for the establishment or re-establishment of land boundaries and the subdivision and platting of land.

Professional Requirements.—Law covers all those practicing or offering to practice professional engineering, architecture or land surveying. Experience without degree: At least six years in active practice of professional engineering, architecture or land surveying of a character satisfactory to the Board. Educational allowance: Each year of teaching or of study in a school of engineering or of architecture of standing satisfactory to the Board shall be considered equivalent to one year of active practice. Society membership: A full member of a National or State engineering or architectural society shall be entitled to registration.

General Requirements.—Citizenship of United States required—or a declaration to become a citizen. Age: At least 25 years. Miscellaneous: Must speak and write the English language, and be of good character and repute.

Examinations.—If the evidence originally presented in the application does not appear to the Board to be conclusive or warranting issuance of a certificate, applicant may present further evidence, which may include results of a required examination. Scope and nature: Not prescribed. Frequency: Not prescribed.

Fees.—For certificate: amount not suggested. For renewal of certificate: Amount not suggested.

Expirations and Renewals.—Certificates shall expire on the last day of .....

* Printed in full in *Proceedings*, Am. Soc. C. E., January, 1920, p. 32.

following their issue and shall become invalid on that date unless renewed. Each registrant shall be notified by the Secretary of the Board one month in advance of the expiration of his certificate. Renewal may be effected any time during the month of ..... by payment of the fee. For failure to renew certificate within the time provided, the registrant shall not be deprived of his right of renewal, but after the month of ..... the fee shall be increased 10% for each month or fraction of a month that payment for renewal is delayed, provided that the maximum fee shall not exceed twice the normal fee.

Significance of Certificate.—Public work: One year after this Act goes into effect, neither the State, nor any political subdivision shall engage in public work involving professional engineering or architecture for which the plans, specifications, and estimates have not been made by, and the construction and maintenance supervised by, a registered professional engineer or a registered architect; provided the contemplated expenditure for the completed project does not exceed $2 000.

Seals.—Each registrant shall obtain a seal of the design authorized by the Board bearing the registrant's name and the legend "registered professional engineer", or "registered architect" or "registered land surveyor". Plans, specifications, plats, and reports may be stamped with said seal.

Exemptions (*See also "Reciprocity"*).—The following exemptions are made: Offering to practice by non-residents; employees of registered practitioners, provided that practice does not include responsible charge of design or supervision; Federal employees of the State or any political subdivision only until existing term of office expires. Corporations or partnerships may engage in the practice of professional engineering, architecture or land surveying provided the person or persons in charge of design or supervision which constitutes such practice is or are registered. Exemptions for individuals apply to corporations and partnerships. Professional engineers and architects are not prohibited from making land surveys essential to engineering or architectural projects. Individuals, firms or corporations are not prohibited from practicing on property owned or leased by them.

Reciprocity.—A non-resident practitioner may practice in the State provided he is legally qualified for such professional service in his own State or country, when this practice does not aggregate more than 15 days in any calendar year. He may be granted a certificate if he holds a like unexpired certificate from another State or territory of the United States or from any province of Canada, in which requirements for registration are of a standard satisfactory to the Board. A new resident may practice, provided he has filed application for registration and has paid the required fee, for such reasonable time as the Board requires in which to consider and grant or deny application.

Revocation of Certificate.—The Board may revoke a certificate for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence, and to examine and cross-examine witnesses.

Penalties.—A person who after this Act has been in effect ..... months is not legally authorized to practice and shall so practice or otherwise violate the provisions of this Act, shall be deemed guilty of a misdemeanor and shall for each offense of which he is convicted be punished by a fine of not less than $100 nor more than $500, or by imprisonment for three months, or by both fine and imprisonment.

Colorado Law for Licensing of Engineers.

Effective July 9th, 1919.

Practitioners at the time the law became effective were allowed one year within which to obtain licenses without examination.

Administration.—Board of five engineers appointed by the Governor; State Engineer is *ex-officio* a member of the Board and its Secretary.

Application for Examination.—Made to State Engineer, Secretary, State Board of Engineer Examiners, Denver, Colo. In not less than 60 nor more than 120 days, the application shall be either approved or denied.

Definition of Engineer.—An Engineer within the meaning of this Act, is a person engaged in the practice of the profession of engineering in any of its branches, except military engineering.

Professional Requirements.—Law covers all engineers. Experience without degree: At least six years in employ or under supervision, direction and tuition of one or more practicing engineers, of which two years must have been in active responsible charge of work—actual supervision and direction requiring the exercise of initiative, judgment and independent decision, as principal or assistant. Educational allowance: Each complete year as a student in an engineering school of recognized reputation is considered as one year of practice. Society membership: No provision.

General Requirements.—Citizenship of United States required. Age: More than 25 years. Miscellaneous: Must be of good moral character.

Examinations.—Required of all applicants, except those in practice at the time the law becomes effective. Scope and nature: Examinations are to be conducted in such manner as the Board may deem best suited to determine the fitness of candidates. Each candidate shall be examined in that branch of engineering in which he is proficient as set forth in his application. The Board may summon any licensed engineer to assist in preparing for and in conducting examinations. Frequency: Not prescribed.

Fees.—For examination: $10.00. For license certificate: $5.00. For renewal of certificate: $5.00 annually.

Expirations and Renewals.—Certificates expire December 31st, each year. If not renewed by March 1st of the succeeding year, they are cancelled. Any person once licensed may be granted a new license without examination at any time upon payment of annual fee.

Significance of Certificate.—The Board has power to limit any license to the practice of surveying according to the qualifications shown by the applicant upon examination. Public Work: No provision. Private Work: No maps, plans, designs, reports, statements or filings to be certified or approved by an engineer shall be accepted or filed by any State official unless the certificate of approval is executed by and bears the seal of a person duly licensed.

Seals.—Every licensed engineer shall have a seal, which must contain his name, place of business, and the words, "Licensed Engineer, State of Colorado", with which he shall stamp all drawings, specifications and reports issued by him for use in the State.

Exemptions (*See also "Reciprocity"*).—Employees of licensed practitioners: Draftsmen or other assistants of licensed engineers are not prevented from acting under instruction, control, or supervision of their employers. Superintendents of construction, paid by the owner, may act if under the control and direction of a licensed engineer. Rights, privileges and duties of architects are not limited by the provisions of this Act. All military engineers are exempt.

Reciprocity.—No provisions.

Revocation of Certificate.—The Board may revoke a certificate for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence and to examine and cross-examine witnesses.

Penalties.—Any person who is not lawfully authorized to practice and shall so practice or otherwise violate the provisions of this Act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine of not more than $500 or by imprisonment in the county jail for not more than 6 months, or by both fine and imprisonment.

Legislative Information.—Senate Bill No. 339, approved April 9th, 1919. Architects are licensed under an Act approved April 26th, 1909, and in force October 25th, 1909.

Florida Law for the Registration of Professional Engineers.

Effective May, 1917.

Practitioners at the time the law became effective were allowed seven months within which to register without examination.

Administration.—Board of five members appointed by the Governor, three civil engineers, one mining or electrical engineer, and one mechanical engineer or naval architect. Each member of the Board must be a member of a recognized engineering society.

Application for Examination.—Made to Secretary, State Board of Engineering Examiners, 215 East Bay Street, Jacksonville, Fla.

Definition of Engineering.—The practice of professional engineering embraces the design and the supervision of the construction of public and private utilities, such as railroads, bridges, highways, roads, canals, harbors, river improvements, lighthouses, wet docks, dry docks, ships, barges, dredges, cranes, floating docks and other floating property, the design and the supervision of the construction of steam engines, turbines, internal combustion engines and other mechanical structures, electrical machinery and apparatus, and of works for the development, transmission or application of power, the design and the supervision of mining operations and of processes and apparatus for carrying out such operations, and the design and the supervision of the construction of municipal works, irrigation works, water supply works, sewerage works, drainage works, industrial works, sanitary works, hydraulic works, and structural works, and other public or private utilities or works which require for their design or the supervision of their construction such experience and technical knowledge as are required in this Act for admission to examination.

Professional Requirements.—Law covers all those who practice professional engineering, other than military engineering. The Board has ruled that submission

of plans for work is the equivalent of practicing engineering. Experience without degree: At least six years in engineering work, one of which shall have been in charge as principal or assistant. Educational allowance: A graduate from an engineering school of recognized good reputation must have at least four years of experience, during one of which he shall have been in charge as principal or assistant. Society membership: No provision.

General Requirements.—Citizenship of United States not required. Age: More than 21 years. Miscellaneous: Must be of good character.

Examinations.—Required of all applicants except those holding certificates from other States. Scope and nature: Prescribed by the Board, examinations may be either oral or partly oral and partly written. (The Board has ruled that examination may consist of applicant's sworn statement of professional education and experience in responsible charge of engineering work. If this statement is not complete or qualifying, the Board may summon applicant to appear for further examination, and investigate his record of professional service). Frequency: Determined by the Board.

Fees.—For examination: $15.00. For certificate of registration: $10.00 additional. For registration without examination: $25.00. For renewal of certificate: $5.00 annually.

Expirations and Renewals.—Certificates to be renewed before date to be fixed by the Board. (The Board has ruled that if a registered engineer shall leave the State and fail to renew his certificate for one or more years, he shall, upon his return, have his certificate renewed upon payment of renewal fee for the current year).

Public Work.—A person acting as a public officer employed by the State, a county, or a municipality is exempted from the provisions of this Act on work the estimated cost of which is $1 000 or less. Every map, plan, and drawing required by law to be certified or approved by a professional engineer shall be certified or approved by a regularly registered engineer and shall bear the date and number of his certificate.

Seals.—No provision. (The Board has adopted a seal for the use of registered engineers which contains the registrant's name, his certificate number, and the words "Registered Engineer, State of Florida").

Exemptions (*See also "Reciprocity"*).—Employees of registered practitioners: An assistant to a registered engineer is not required to register. (The Board has ruled that an assistant is not exempt when he is in responsible charge of work). The execution as a contractor of work designed by a professional engineer or the supervision of such work as a foreman or superintendent for the contractor is not deemed to be the practice of professional engineering. Employees of the Federal Government are exempt; State and municipal employees must register. The Act applies to every corporation, domestic or foreign, engaged in professional engineering within the State, except that certificates are to be held by its officers or employees instead of by the corporation. The Act does not apply to architects registered in the State. All military engineers are exempt.

Reciprocity.—A non-resident practitioner may be granted a certificate without examination upon payment of a $25.00 fee and presentation to the Board of satis-

factory evidence that he holds a certificate in another State, territory, or country where requirements are not lower than in the State. A new resident, provided he has applied for certificate and has paid the required fee, may practice for such reasonable time (6 months prescribed by the rules of the Board) as is necessary for registration.

Revocation of Certificate.—The Board may revoke a certificate for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence and to examine and cross-examine witnesses.

Penalties.—Any person who is not legally authorized to practice and shall so practice or otherwise violate the provisions of this Act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished according to law, and in addition his certificate of registration shall be automatically revoked.

Legislative Information.—Chapter 7404 (No. 146), Acts of 1917. Architects are covered by a separate law.

Idaho Law for Registration of Civil Engineers.

Effective May 1st, 1919.

Practitioners at the time the law became effective were allowed one year within which to register without examination.

Administration.—Department of Law Enforcement. Seven registered civil engineers, designated by the Commissioner of Law Enforcement, shall guide him in the administration of the law.

Application for Certificate of Registration.—Made to the Department of Law Enforcement, Boise, Idaho, in writing under oath in such form and accompanied by such proof of applicant's fitness to practice as the Department may from time to time prescribe. Must be accompanied by an unmounted photograph taken within a year.

Definition of Engineering.—Civil Engineering, within the meaning of the Act, is the practice of any branch of the profession of engineering other than mining, metallurgical and military. Said profession embraces the design and supervision of the construction of all public or private utilities except those in connection with mining operations exclusively, and other works which require experience, and the same technical knowledge as engineering schools of recognized reputation prescribe for graduation. The requirements of the University of the State of Idaho for the degree of Civil Engineer are adopted as the standard.

Professional Requirements.—Law covers all those who practice or offer to practice civil engineering. Experience without degree: At least six years of actual engagement in engineering work as assistant or otherwise. Educational allowance: Graduation from a school of engineering of recognized reputation is accepted in lieu of practical experience. Society membership: No provision.

General Requirements.—Citizenship of United States not required. Age: More than 21 years. Miscellaneous: Must be of good character.

Examinations.—Required of all applicants except those from other States. If a candidate fails on the first examination, he may, after an interval of not less than six months nor more than one year, have a second examination without additional fee. Scope and nature: To be prescribed by the Department. Frequency:

Semi-annually in State Capitol, at Boise, beginning at 9 A. M. the second Tuesday of March and September. Application must be received 10 days before the date of the examination.

Fees.—For residents: $10.00. For non-residents: $25.00. For renewal: $2.00 annually.

Expirations and Renewals.—Certificates must be renewed July first each year, or Department shall cancel.

Significance of Certificate.—No map, plan, or drawing required by law to be certified or approved by a civil engineer shall be accepted or filed by State, county, or municipal authority, unless the certification or approval is executed by a person duly registered in accordance with the provisions of this Act.

Seals.—No provision.

Exemptions (See also "Reciprocity").—The following exemptions are made: Employees of registered practitioners when acting as assistants; engineers working for the United States Government; non-resident engineers entering the State for consultation, collecting information, or giving expert testimony in court; mining, metallurgical and military engineers.

Reciprocity.—A non-resident practitioner may be granted a certificate without examination if licensed or registered in another State where the minimum requirements are not less than in the State. A resident of a State which does not provide for registering or licensing may, upon presentation of satisfactory evidence that he is qualified as prescribed in the law and has practiced for an additional period of not less than 4 years immediately preceding his application, be granted a certificate of registration without examination. (The Department has ruled that an applicant must have obtained a grade of 70% in the examination in his own State, and must submit to a practical examination as to his fitness for licensure at a regular examination.)

Revocation of Certificate.—The Department may revoke a certificate for cause only after a hearing at which the accused has the opportunity of appearing and being heard.

Penalties.—Any person who unlawfully practices or otherwise violates the provisions of the Act shall be deemed guilty of a misdemeanor. Any person who attempts to obtain a certificate by fraud or by forged evidence, or to practice under such a certificate shall be deemed guilty of a felony.

Legislative Information.—Chapter 64, Session Laws, 1919, approved March 14th, 1919. Expiration of Certificate and Renewal Fee, Chapter 138 (S. B. No. 187), approved March 18th, 1919. Registration of Architects covered by Chapter 8, Session Laws, 1919, Sections 10-21. Registration of Surveyors covered by Chapter 93, Sections 1402-1410.

Illinois Law for Registration of Structural Engineers.

Effective January 1st, 1920.

Licenses or certificates of registration issued under a previous law shall be effective for the period for which issued.

Administration.—Director of Registration and Education. Professional features administered by committee of five structural engineers appointed from time to time by the Director.

Application for Certificate.—Upon prescribed blanks to Department of Registration and Education, Springfield, Ill.

Definition of Structural Engineer.—A person shall be regarded as practicing structural engineering within the meaning of the Act who is engaged in the designing or supervising of the construction, enlargement, or alteration of structures, or any part thereof, for others, to be constructed by persons other than himself. Structures within the meaning of the Act are all structures, having as essential features, foundations, columns, girders, trusses, arches and beams, with or without other parts, and in which safe design and construction require that loads and stresses must be computed and the size and strength of parts determined by mathematical calculations based upon scientific principles and engineering data. A person shall also be regarded as practicing structural engineering within the meaning of the Act who is engaged as a principal in the designing and supervision of the construction of structures or of the structural part of edifices designed solely for the generation of electricity; or for the hoisting, cleaning, sizing or storing of coal, cement, sand, gravel or similar materials; elevators; manufacturing plants; docks; bridges; blast furnaces; rolling mills; gas producers and reservoirs; smelters; dams; reservoirs; water-works; sanitary works as applied to the purification of water; plants for waste and sewage disposal; roundhouses for locomotives; railroad shops; pumping or power stations for drainage districts; or power houses, even though such structures may come within the definition of "buildings" as defined in any Act in force in the State relating to the regulation of the practice of architecture.

Professional Requirements.—Law covers all persons practicing or attempting to practice structural engineering. Experience without degree: Not less than six years in Illinois or in another State or territory, or in a foreign country or province, within ten years immediately preceding application. Must have been in responsible charge as principal or assistant for at least two years. Educational allowance: Every applicant who shall have graduated from a school of structural engineering approved by the Department, requiring a course of not less than four school years of at least 30 weeks, shall be credited with two years upon the required six-year period. The Department may credit not to exceed two years to an applicant who has pursued the course, but who has not graduated. Society membership: No provision.

General Requirements.—Citizenship of United States not required. Age: At least 21 years. Miscellaneous: Must be of good moral character and temperate habits.

Examinations.—Required of all who cannot fulfill conditions stated under "Reciprocity", "Exemptions" and "Professional Requirements". Scope and nature: Written and oral tests; shall embrace subjects normally taught in schools of structural engineering. (The Department has prescribed that examinations shall occupy three days and shall cover theoretical and applied mechanics, definitions, general engineering knowledge, stress analysis, static and moving loads, design

and construction in reinforced concrete, steel, wood, masonry and foundations.) Frequency: Determined by the Department.

Fees.—For examination for certificate: $10.00. For certificate of registration: $5.00. For examination to determine preliminary education: $5.00. For restoration of an expired certificate: $5.00. For renewal of certificate: $1.00 annually. For certificate to those who hold a like certificate from another State or country: $15.00.

Expirations and Renewals.—Each registered structural engineer must renew his certificate annually before July 1st. Every certificate not renewed expires August 1st. An expired certificate may be renewed only upon payment of the restoration fee. Any registered structural engineer who retires from active practice for not more than five years may renew his certificate upon payment of all lapsed renewal fees.

Significance of Certificate.—Public work: No provision. Private work: Must be registered to engage in private work.

Seals.—Every registered structural engineer shall have a seal, which shall contain his name, place of business, and the words, "Registered Structural Engineer, State of Illinois". Seal obtained prior to July 1st, 1919, may bear the words "Licensed Structural Engineer". All plans, drawings, and specifications prepared by or under the supervision of a registered engineer must be stamped with his seal.

Exemptions (*See also "Reciprocity"*).—The following exemptions are made: Present practitioners who can prove that on July 5th, 1915, they were actually engaged in the practice of structural engineering and did not apply by January 5th, 1916, for a license without examination, as then required by law, shall be entitled to examination without regard to number of years they have practiced (any license or certificate of registration heretofore issued shall, during the unexpired period for which it was issued, serve the same purpose as the certificate provided for by the Act); employees of registered practitioners: draftsmen, students, clerks of work, superintendents and other employees of registered structural engineers when acting under the immediate personal supervision of their employees; superintendents of construction in the pay of the owner when acting under the immediate personal supervision of the registered structural engineer who prepared the drawings and specifications; any person, mechanic or builder, when making plans or specifications for, or supervising construction, enlargement or alteration of, any structure or building to be constructed by himself, or his employees, and for his own use.

It is lawful for a corporation to prepare drawings, plans and specifications for buildings and structures, which are constructed, erected, built, or their construction supervised by the corporation, if the chief executive officer or managing agent of the corporation in the State is a registered structural engineer. One or more registered structural engineers may lawfully enter into partnership with one or more registered architects. Persons registered to practice structural engineering are exempt from the operation of any Act relating to the regulation of the practice of architecture.

Reciprocity.—A non-resident practitioner, who is a structural engineer, registered or licensed under the laws of another State or territory, or of a foreign country or province, may, without examination, upon payment of fee, be granted a certificate of registration, provided that requirements for registration or licensing in particular State, territory, country or province were substantially equal to the requirements then in force in this State.

Revocation of Certificate.—Certificates may be revoked for cause only after public hearing at which the accused may produce witnesses and be heard.

Penalties.—Violation of the provisions of this Act constitutes a misdemeanor, punishable upon conviction by a fine of not less than $25 nor more than $200.

Legislative Information.—The Act must be known and cited as "The Illinois Structural Engineering Act". Approved June 24th, 1919. See also "An Act in relation to the civil administration of the State government, and to repeal certain acts therein named", approved March 7th, 1917, in force July 1st, 1917, which repeals "An Act to provide for the licensing of structural engineers" approved and in force July 5th, 1915.

Iowa Law for Registration of Professional Engineers and Land Surveyors.

Effective July 4th, 1919.

Practitioners at the time the law became effective were allowed six months within which to register without examination.

Administration.—Board of five members, appointed by the Governor, no two from the same branch of the profession. Each member of the Board shall be a member of a State or National engineering society.

Application for Examination.—Made to the State Board of Engineering Examiners, Des Moines, Iowa.

Definitions.—Professional Engineering means the practice of any branch of the profession other than military engineering. The practice of said profession embraces the design and the supervision of the construction of public and private utilities, such as railroads, bridges, canals, harbors, river improvements, lighthouses, wet docks, dry docks, ships, barges, dredges, cranes, floating docks and other floating property, the design and the supervision of the construction of steam engines, turbines, internal combustion engines and other mechanical structures, electrical machinery and apparatus, and of works for the development, transmission or application of power; and the design and the supervision of the construction of municipal works, irrigation works, water supply works, sewage works, drainage works, industrial works, sanitary works, hydraulic works, structural works and other public and private utilities or works which require for their design or the supervision of their construction such experience and technical knowledge as are required by this Act. Land Surveying is surveying having to do with the boundaries or areas of tracts of land. The surveying of lands for the purpose of sub-dividing or determining boundary lines where no contest is involved shall not be deemed to be the practice of land surveying within the meaning of the Act.

Professional Requirements.—Law covers all those who practice professional engineering or land surveying. Experience without degree: At least six years

in the practice of engineering or land surveying, one year of which shall have been in charge as assistant. Educational allowance: Each year at an engineering school of recognized standing is counted equivalent to one year in practice. Society membership: No provision.

General Requirements.—Citizenship of United States not required. Age: More than 25 years. Miscellaneous: Must be of good character.

Examinations.—Required of all applicants except those from other States. Scope and nature: To be prescribed by the Board. Frequency: To be given at a stated or called meeting of the Board.

Fees.—For examination: $15.00. For certificate of registration: $10.00 additional. For reinstatement of certificate that has been revoked: $10.00. For certificate without examination: $25.00 (to practitioners when law became effective). For certificate without examination: $10.00 (to person registered in another State having standards that are not lower than those of Iowa).

Expirations and Renewals.—No provision.

Private Work.—Must be registered to engage in the private practice of engineering or land surveying. Registered land surveyors may administer oaths to their assistants and to witnesses produced for examination of facts connected with land surveys.

Seals.—The Board shall provide each candidate who has qualified for registration with a seal with which he shall stamp all plans, specifications, and reports issued by him.

Exemptions (*See also "Reciprocity"*).—The following are exempt: Employees of registered practitioners; the execution as a contractor of work designed by a professional engineer, or the supervision of the construction of such work as a foreman or superintendent for such contractor is not deemed to be the practice of professional engineering; employees of the Federal Government; any full-time employee of any corporation while doing work for that corporation, except in the case of corporations offering their services to the public as professional engineers or land surveyors.

Corporations engaged in designing and building works for public or private interests not their own are deemed to practice professional engineering. With respect to such corporations all principal designing or constructing engineers shall hold certificates of registration. This Act does not apply to corporations engaged solely in building said works. A certificate of registration as a professional engineer does not carry with it the right to practice land surveying unless it is specifically permitted by said certificate, which permission shall be granted by the Board without an additional fee in the case of any applicant duly qualified. The construction, improving or extending of private drains, or drainage works, private irrigation works, private water supply works, or other works of a private nature, is not deemed to be the practice of engineering.

Reciprocity.—A non-resident practitioner may be granted a certificate without examination upon payment of a $10.00 fee and presentation to the Board of satisfactory evidence that he holds like certificate in another State where the requirements are not lower than in Iowa. A new resident, provided he has filed application for a certificate and has paid the required fee, may practice for such

reasonable time prescribed by the rules of the Board, as is necessary for registration.

Revocation of Certificate.—A certificate is to be considered revoked when no reply is received after two attempts have been made by the Board to communicate with the registrant; any certificate revoked for such cause may be reinstated upon due application and payment of the fee of $10.00. The Board may revoke a certificate for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence and to examine and cross-examine witnesses.

Penalties.—Any person who, after the Act has been in effect for one year, is not legally authorized to practice and shall so practice or otherwise violate its provisions shall be deemed guilty of a misdemeanor and shall for each offense of which he is convicted be punished by a fine of not less than $100 nor more than $500, or by imprisonment for 3 months, or by both fine and imprisonment.

Legislative Information.—Chapter 392, Senate File No. 186, Acts of the Thirty-Eighth General Assembly; approved April 25th, 1919; in effect July 4th, 1919.

Louisiana Law for Licensing Civil Engineers and Surveyors.

Effective July 8th, 1920.

Administration.—Board of five practicing civil engineers or surveyors of good standing, appointed by the Governor.

Application for License or Examination.—Made to State Board of Engineering Examiners, Maison Blanche Building Annex, New Orleans, La.

Professional Requirements.—Law covers those who practice civil engineering and land surveying. Experience without degree: No practical experience prescribed. An applicant must present to the Board a diploma from an engineering college or school of good standing, said standing to be determined by the Board, or satisfactory evidence that such diploma has been granted, or must pass a satisfactory examination. Society membership: No provision.

General Requirements.—Citizenship of United States not required. Age: 21 years. Miscellaneous: Must be of good character and possess at least a fair, primary education.

Examinations.—Required of all who are not graduates of an engineering college or school of good standing. Scope and nature: For surveying, covers geometry, trigonometry, land surveying and practical use of instruments; for engineering, covers in addition, physics, including practical problems in design and construction. Frequency: Not prescribed.

Fees.—For examination: $25.00; if applicant fails to pass and no certificate is issued $5.00 of this fee is retained. For registration by diploma: $25.00. For registration of holder of license from another State: $15.00. For issuing license certificate: $1.00; for recording, $1.00. For renewal of license for Engineering: $3.00 annually. For renewal of license for Surveying: $1.00 annually. For renewal after license has been revoked, for Engineers: $10.00. For renewal after license has been revoked, for Surveyors: $5.00.

Expirations and Renewals.—Licenses must be renewed before February first each year, or in case of absence from the State, within thirty days after return.

If a license is not renewed within the time limit, it shall be revoked, but may be renewed at any time thereafter upon payment of the required fee.

Significance of Certificate.—Public work: No special provision. (The Attorney-General has expressed the opinion that no political sub-division of the State can legally employ any engineer and surveyor who is not licensed.) Private work: Must be licensed to engage in private practice of civil engineering or land surveying.

Seals.—Board is authorized to adopt and use an official seal.

Exemptions (See also "Reciprocity").—Temporary permits: Any member of the Board may grant a temporary permit to practice after a satisfactory examination of any applicant, but such permit shall not continue beyond the next regular meeting of the Board, and shall in no case be granted less than six months after the applicant has been refused a permit by the Board. Civil engineers and surveyors in the employ of the Federal government are exempt. No special provisions for State and municipal employees. Members of companies or corporations must qualify for licenses as individuals. Non-professionals may run levels for terracing rice fields when registered engineers and surveyors are unavailable, but they may not make a practice of such work.

Reciprocity.—Non-resident practitioners are exempted when in actual consultation with registered civil engineers or surveyors of the State, or may be registered upon payment of fee of $15.00 and presentation of satisfactory evidence of holding a similar certificate in another State, where the requirements are satisfactory to the Board, provided like privilege is granted to applicants from Louisiana in that State.

Revocation of Certificate.—The Board may revoke a certificate when the holder has been convicted of immoral conduct before a competent court.

Penalties.—Any person who shall practice or attempt to practice without having complied with the provisions of the Act shall be fined not less than $100 nor more than $500, or shall be imprisoned not less than 30 nor more than 90 days for each offense.

Legislative Information.—Act No. 242 of 1920; Senate Bill No. 26 by Mr. Beale; approved July 8th, 1920. This Act amends and re-enacts Act No. 200 of 1914, and Act No. 308 of 1908.

Michigan Law for Registration of Architects, Engineers and Surveyors.

Effective August 14th, 1919.

Practitioners at the time the law became effective were required to register by March 1st, 1920.

Administration.—Board of seven examiners appointed by the Governor; two architects and five engineers.

Application for Examination.—Made to State Board of Examiners for the Registration of Architects, Engineers and Surveyors, Lansing, Mich.

Professional Requirements.—Law covers any person who represents himself to be an architect, an engineer, or a surveyor. The Board shall have power to classify applicants as civil, mining, mechanical, electrical, chemical and by other

branches. Experience without degree: Not less than six years in practical architectural or engineering work or surveying under the direction or supervision of a registered architect, or a registered engineer, or a registered surveyor, or of an architect, or engineer, or surveyor of equivalent professional standing. Educational allowance: Time as a student of architecture or engineering in a college or school of recognized standing is considered the equivalent of an equal amount of practical experience. Society membership: No provision.

General Requirements.—Citizenship of United States required. Age: Must be of legal age. Miscellaneous: Must be of good moral character.

Examinations.—Required of all who desire to begin the practice of architecture, engineering or surveying as principal or in responsible charge, except those from other States. Scope and nature: Includes English language, and other appropriate subjects. Frequency: Not prescribed.

Fees.—For examination: $5.00. For certificate of registration: $15.00 additional. For certificate of registration without examination: $20.00. For renewal of certificate: $5.00 every five years.

Expirations and Renewals.—All certificates expire January 1st, 1925, and January 1st of each fifth year thereafter, and are subject to renewal upon application not less than thirty days preceding the date of expiration upon payment of fee.

Significance of Certificate.—Public work: After March 1st, 1920, neither the State, nor any county, township, municipality or village shall engage in the construction or maintenance of any public work of an architectural or engineering character, for which plans, specifications and estimates shall not have been prepared by a registered architect or a registered engineer, and the construction of which is not supervised by such a registered architect or registered engineer, provided that nothing in this section shall be held to apply to items of maintenance, repair or construction wherein the contemplated expenditure for the completed project does not exceed $2 000. Private work: After March 1st, 1920, no city or village plat, or plat of an addition thereto or of a subdivision thereof, or any plat dividing land into streets, lots or blocks, shall be received for record, which has not been prepared by a registered engineer or a registered surveyor and signed by him as such.

Seals.—No provision.

Exemptions (*See also "Reciprocity"*).—Present practitioner: Any person qualified to use the title "registered architect" before the Act took effect shall be considered as registered under the Act. Any citizen of the State engaged in practice as an engineer or as a surveyor as principal or in responsible charge for not less than two years before the Act went into effect, shall be granted a certificate. Any person, firm or corporation is not prevented from preparing plans and specifications for buildings to be erected by themselves. Employees of railroads or other interstate corporations whose employment is confined to such corporations, need not register. Private work: Nothing in this Act shall prevent any person from doing any of the engineering, architectural or surveying work mentioned herein upon or in connection with the construction of residence buildings, barns or garages and other private buildings.

Reciprocity.—Non-resident practitioners: The Board shall register architects and engineers of other States and of foreign countries when they are recognized as consulting specialists and have had at least 10 years of experience as such, or when they present credentials showing that they have qualified for such work under equivalent laws of their own States or Governments and are still in good standing thereunder, provided that such laws extend similar privileges to registrants under the Act.

Revocation of Certificate.—The Board may revoke a certificate for cause after the accused has been given opportunity for hearing.

Penalties.—Any violation of the provisions of the Act shall be a misdemeanor punishable for the first offense by a fine of not more than $100, and for a subsequent offense by a fine of not more than $500, or by imprisonment for not more than one year, or by both fine and imprisonment.

Legislative Information.—Act No. 334, Public Acts of 1919, effective August 14th, 1919. Act No. 120, Public Acts of 1915, relating to Registration of Architects, repealed.

New York Law for Licensing Professional Engineers and Land Surveyors.

Effective May 14th, 1920.

Present practitioners must obtain licenses within two years.

Administration.—In hands of a board of five licensed engineers appointed by the Regents of the University of the State of New York.

Application for Certificate.—Must be made on prescribed form to Regents of the University of the State of New York, Albany, N. Y.

Definition of Land Surveying.—Land surveying as covered by this Act refers to surveys for the determination of areas or for the establishment or re-establishment of land boundaries and the sub-division and platting of land.

Professional Requirements.—Law covers all those practicing or offering to practice professional engineering or land surveying. Experience without degree: To practice Engineering—six or more years of active professional engineering work, one of which shall have been in responsible charge, of a character satisfactory to the Board; to practice Land Surveying—four or more years of active engagement in land surveying work of a character satisfactory to the Board. Educational allowance: Each two years of study of engineering in a school of engineering of standing satisfactory to the Regents considered as equivalent to one year of active practice. Society membership: No provision.

General Requirements.—Citizenship of United States: Not required to practice Engineering; required to practice Land Surveying—or a declaration to become a citizen. Age: At least 21 years. Miscellaneous: Must be of good character and repute. To practice Land Surveying, must speak and write the English language.

Examinations.—If evidence presented in the application does not appear to the Board to be conclusive or warranting issuance of a certificate, applicant may present further evidence, which may include the result of a required examination. Nature: Not prescribed. Frequency: Not prescribed.

Fees.—For certificate to practice Engineering or Land Surveying: $25.00. For certificate to practice both Engineering and Land Surveying: $35.00. If issuance of certificate be denied, fee shall be returned.

Expirations and Renewals.—No provisions.

Public Work.—Two years after the Act takes effect, no county, city, town or village, or other political sub-division shall engage in construction or maintenance of any public work involving professional engineering or land surveying for which plans, specifications and estimates have not been made by, and construction and maintenance supervised by, a licensed engineer or land surveyor, provided contemplated expenditure for completed project does not exceed $2 000.

Seals.—Each licensee may obtain a seal of a design authorized by the Board, bearing the licensee's name and the legend "licensed professional engineer" or "licensed land surveyor". Plans, specifications, plats, and reports may be stamped with said seal.

Exemptions (*See also "Reciprocity"*).—The following are exempt: Offering to practice by non-resident; Employees of licensed practitioners, so long as practice does not include responsible charge of design or supervision as principal; employees of the State or any political sub-division are exempted from the time the Act becomes effective only until the then existing term of office expires; officers or employees of the United States. Corporations or partnerships may engage in the practice of engineering or land surveying provided the person or persons connected with such corporation or partnership in charge of design or supervision which constitutes such practice is or are licensed. The same exemptions as apply to individuals apply to corporations and partnerships. Engineers are not prohibited from making land surveys essential to engineering projects.

Reciprocity.—A non-resident practitioner may practice in the State, provided he is legally qualified for such professional service in his own State or country, where the necessary qualifications for which meet the requirements of the Board of Regents; he may be granted a certificate upon payment of the required fee if he holds a like unexpired certificate from another State or territory in the United States in which the requirements for license or registration are of a standard satisfactory to the Board. A new resident, provided he has filed application for license and has paid the required fee, may practice for such reasonable time as the Board requires in which to consider and grant or deny the application.

Revocation of Certificate.—The Regents may revoke a certificate for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence and to examine and cross-examine witnesses.

Penalties.—Any person who, after the Act has been in effect two years, is not legally authorized to practice and shall so practice or otherwise violate its terms, shall be deemed guilty of a misdemeanor and shall for each offense of which he is convicted be punished by a fine of not less than $100 nor more than $500, or by imprisonment for three months or by both fine and imprisonment.

Legislative Information.—Law is Article IV-A of Chapter 25, Laws of 1909; approved May 14th, 1920. Introduced in Senate, No. 1104, by Mr. Ferris, March 17th, 1920. Article VII-A, Chapter 25, Laws of 1909, applies to registration of architects.

Oregon Law for the Registration of Professional Engineers.

Effective May 29th, 1919.

Practitioners at the time the law became effective were allowed seven months within which to register.

Administration.—Board of nine members appointed by the Governor—two civil, two mechanical, one electrical, two hydraulic and two mining engineers.

Application for Examination.—Made to Secretary, State Board of Engineering Examiners, Salem, Ore.

Definition of Engineering.—The practice of professional engineering embraces the design and the supervision of the construction of public and private utilities such as railroads, bridges, highways, roads, canals, harbors, river improvements, lighthouses, wet docks, dry docks, ships, barges, dredges, cranes, floating docks and other floating property, the design and the supervision of the construction of steam engines, turbines, internal combustion engines and other mechanical structures, electrical machinery and apparatus, and of works for the development, transmission or application of power, the design and the supervision of mining operations and of processes and apparatus for carrying out such operations, and the design and the supervision of the construction of municipal works, irrigation works, water supply works, sewerage works, drainage works, industrial works, sanitary works, hydraulic works and structural works and other public or private utilities or works which require for their design or the supervision of their construction such experience and technical knowledge as are required in this Act for admission to examination. The enumeration of any public or private utilities or works shall not be construed as excluding any other public or private utilities or works which require such experience and technical knowledge for their design or the supervision of their construction.

Professional Requirements.—Law covers all those who practice professional engineering, other than military engineering. Experience without degree: At least six years in engineering work, one of which shall have been in charge as principal or assistant. Educational allowance: A graduate from an engineering school of recognized good reputation must have at least two years of experience during one of which he shall have been in charge as principal or assistant. Society membership: No provision.

General Requirements.—Citizenship of United States not required. Age: More than 21 years. Miscellaneous: Must be of good character.

Examinations.—Required of all applicants except those holding certificates from other States. Scope and nature: To be prescribed by the Board; may be either oral or partly oral and partly written. Frequency: To be determined by the Board.

Fees.—For examination: $10.00. For certificate of registration: $5.00 additional. For certificate of registration without examination: $15.00.

Expirations and Renewals.—No provisions.

Significance of Certificate.—Public work: No provision. Private work: After January 1st, 1920, every map, plan and drawing required by law to be certified or approved by a professional engineer shall be certified or approved by a regularly registered engineer and shall bear the date and number of his certificate.

Seals.—No provision.

Exemptions (*See also "Reciprocity"*).—Employees of registered practitioners: An assistant to a registered engineer is not required to register. Contractors and superintendents: Execution as a contractor of work designed by a professional engineer or supervision of such work as a foreman or superintendent is not deemed practice of professional engineering. Employees of the Federal Government are exempt; State and municipal employees must register. Professional engineers in military service may be registered without examination within a year from date of discharge. The Act does not apply to architects registered in the State. All military engineers are exempt.

Reciprocity.—A non-resident practitioner may be granted a certificate without examination upon payment of a $15.00 fee and presentation to the Board of satisfactory evidence that he holds a like certificate in another State, territory or country where the requirements are not lower than in Oregon. New residents: Any professional engineer coming from without the State and possessing the qualifications shall be permitted to practice for a period not exceeding three months before making application for examination or for certificate.

Revocation of Certificate.—The Board may revoke a certificate for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence and to examine and cross-examine witnesses.

Penalties.—Any person who is not legally authorized to practice and shall so practice or otherwise violate the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction, shall be subject to a fine of not less than $25 nor more than $500, or to imprisonment in the county jail not to exceed six months.

Legislative Information.—Chapter 381, General Laws, 1919; House Bill No. 263; filed in the office of the Secretary of State, March 4th, 1919, to take effect July 1st, 1919. Registration of architects is covered by Chapter 418, General Laws, 1919.

Virginia Law for Registration of Professional Engineers, Architects and Land Surveyors.

Effective June 19th, 1920.

Registration optional; present practitioners are not limited as to time within which to register.

Administration.—Board of three architects, three engineers, and three land surveyors, appointed by the Governor. In determining qualifications of applicants for certification as architects, majority vote of architect members of board, only, is required; similarly for engineers, and for land surveyors.

Application for Examination.—Made to State Board for Examination and Certification of Architects, Professional Engineers and Land Surveyors, Richmond, Va.

Professional Requirements.—Law covers all those practicing professionally one or more branches of engineering, architecture, or land surveying, as certified practitioners. Experience without degree: To practice architecture or engineering—not less than four years of practical experience under the direction or supervision of a certified architect or certified engineer, or architect or engineer of equivalent

standing; to practice land surveying—not less than two years of practical experience under the direction or supervision of a certified land surveyor, or land surveyor of equivalent professional standing. Educational allowance: Time spent as a student of architecture, engineering or land surveying in a college or school of recognized standing is considered the equivalent of an equal amount of practical experience. Society membership: No provision.

General Requirements.—Citizenship of United States necessary—or a declaration to become a citizen. Age: At least 21 years. Miscellaneous: Must be of good character. Registration not compulsory. Law merely protects the terms "certified architect", "certified professional engineer", and "certified land surveyor".

Examinations.—Required of all applicants except those in practice at the time the law becomes effective and those from other States. Scope and nature: To be prescribed by the Board. Frequency: At least once each year at Richmond, Va., and at such other places and times as the Board may designate.

Fees.—For each examination: $20.00. For certificate without examination: $5.00 to residents of six years' practice of architecture or engineering or two years' of land surveying at the time the law goes into effect.

Expirations and Renewals.—No provisions.

Significance of Certificate.—Public work: No provision. Private work: Not necessary to have certificate to carry on work, unless designations "certified professional engineer", "certified architect" or "certified land surveyor," are used.

Seals.—No provision.

Exemptions (See also "Reciprocity").—Present practitioners may be granted certificates without examination, upon payment of fee and upon satisfactory evidence, for architects and engineers, of not less than six years, and for land surveyors, of not less than two years, of professional practice. Engineers are not excluded from the practice of architecture, nor architects from the practice of engineering.

Reciprocity.—Non-resident practitioners: Examination may be waived if the applicant is from another State where the qualifications prescribed are equal to those prescribed in Virginia, provided a like privilege is granted to applicants from Virginia in that State.

Revocation of Certificates.—Certificates may be revoked for cause only after a hearing at which the accused has the right to be represented by counsel, to introduce evidence, and to examine and cross-examine witnesses.

Penalties.—After six months from the date the Act becomes effective, the use by any person of the title of "certified professional engineer", "certified architect," or "certified land surveyor" without compliance with the provisions of the Act shall be deemed a misdemeanor, and such person shall be punishable by a fine of not more than $100.

Legislative Information.—Chapter 328 (S. B. 226), approved March 19th, 1920.

Wyoming Law for the Licensing of Surveyors and Engineers.

Effective February 25th, 1919.

To practitioners holding licenses under a previous law, new licenses shall be issued without examination.

Administration.—Board of three engineers, appointed by the Governor; State Engineer, member and Secretary.

Application for Examination.—Made to State Board of Examining Engineers, Cheyenne, Wyo.

Professional Requirements.—Law covers any person who shall perform any surveying or engineering work relating to drainage, highway, municipal, county or State projects, survey of property lines or rights of way or preparation of applications for permits for use of water, or otherwise relative to the use of water. Experience without degree: No provision. Educational allowance: No provision. Society membership: No provision.

General Requirements.—Citizenship of United States: No provision. Age: No provision. Miscellaneous: No license shall be issued to any applicant who is incompetent, dishonest, intemperate, or addicted to any habit which would render him an unsafe employee. Each licensee is required to furnish a satisfactory surety bond of $500.

Examinations.—Required of all applicants except those licensed under previous Acts. Nature: Written examination and investigation by the Board of record, training and experience. Frequency: Not prescribed.

Fees.—For examination: $10.00; should applicant fail to pass, he may be re-examined within a year without payment of additional fee. For certificate of license without examination: $5.00.

Expirations and Renewals.—Each license shall be in force only as long as the surety bond shall remain in good standing.

Significance of Certificate.—Public work: All surveying and engineering work done by or under authority of any village, town, city, county or other political subdivision, or the State, shall be performed by or under the direction of a person licensed as provided by the Act, and no town, city or county surveyor or engineer, or surveyor or engineer employed by the State shall be eligible to appointment, re-appointment, election or re-election, until he has secured such license. Private work: Must be licensed to engage in the private practice of engineering or surveying. Every licensed surveyor and engineer is authorized to administer and certify oaths for application for the use of water or for preparation of petitions in connection with the use of water, or when it becomes necessary to take testimony to identify old or lost corners or to perpetuate a corner which is in a perishable condition, or whenever the importance of the survey makes it desirable to administer oaths to assistants for the faithful performance of their duties, and in administering such oath shall use an impression seal of form prescribed by the Board.

Seals.—Each licensee shall use a seal of the form prescribed by the Board, giving name, place of residence, and license number.

Exemptions (*See also "Reciprocity"*).—Present practitioners holding licenses in grades of "junior" and "senior" engineer by virtue of a previous Act shall be classed as "engineers" and those holding surveyors' licenses, as "surveyors", under provisions of this Act. Upon payment of a $5.00 fee, the Board shall issue licenses. The Act does not apply to engineers of the United States engaged in the prosecu-

tion of Federal engineering work. The holder of an engineer's license is permitted to practice all classes of surveying and engineering.

Reciprocity.—No provision.

Revocation of Certificate.—The Board may revoke any certificate for cause.

Penalties.—Any person not licensed in accordance with the provisions of the Act who shall practice or otherwise violate its provisions shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not more than $200 or imprisoned for not more than six months, or be both fined and imprisoned.

Legislative Information.—Chapter 120; Session Laws, 1919; Senate File No. 48; Approved February 25th, 1919. Repeals Chapters 60 and 69, Compiled Statutes 1910; Chapters 18 and 118, Session Laws, 1917.

Progress Report of Military Affairs Committee

The following Progress Report of the work of the Military Affairs Committee, under date of August 18th, 1920, has been made to Engineering Council:

"On October 15th, 1919, at a meeting of the American Society of Civil Engineers, in the Engineering Societies Building, New York City, the relations of engineers to the future military activities of the United States was discussed.

"At this meeting there were present the Chief of Engineers, U. S. A., the former Chief Engineer, A. E. F., the Chief of the Construction Division, and many other officers of the Corps of Engineers, Quartermaster Corps and other branches of the service, as well as a large number of engineers, members of the several societies represented in Engineering Council. After a full discussion at the meeting it was resolved that:

" 'It is the sense of this meeting that Engineering Council should take the necessary steps to formulate a comprehensive series of recommendations to be presented to Congress in connection with the Relations of the Engineer to the Future Military Activities of the United States, the subject-matter of the discussion this evening.'

"As a result of the above suggestion, Engineering Council appointed a Committee which, with subsequent additions, has been composed as follows:

"Col. William Barclay Parsons, Chairman, Messrs. Paul G. Brown, Harold W. Buck, George Gibbs and Spencer Miller, Dr. Leonard Waldo, Col. R. D. Black, Col. F. J. Miller, Col. F. A. Snyder, Col. Lincoln Bush, Col. W. A. Starrett, Col. H. S. Crocker, Col. G. R. Solomon, Capt. A. B. Fry (Navy), Col. F. A. Molitor, Col. B. W. Dunn, Col. J. J. Carty (Resigned), Lt.-Col. F. E. Humphreys, Maj. A. S. Dwight, and Lt.-Col. George D. Snyder, Secretary.

"The instructions received from Engineering Council were:

" '1st.—To ascertain what legislation is needed to enable the country to make the best use of its engineering resources in personnel and material in time of war.

" '2d.—To urge on Congress the passage of such legislation.

" '3d.—Co-operation between the technical services in the Army, the National Guard, the Officers Reserve Corps and in civil life to obtain training and team work in peace as in war.'

"By the time your Committee was organized, the Senate and the House of Representatives had each passed bills covering the reorganization of the Army. The underlying principles of these bills were so different that both bills had been referred to a Conference Committee. The situation was therefore such that it was not possible for your Committee to make to Engineering Council any suggestion as to legislation, other than that of February 26th, 1920,* recommending

* *Proceedings*, Am. Soc. C. E., March, 1920, p. 345.

that the principle of universal military training be incorporated in military legislation. Congressional action was waiting and depending on the decision of the Joint Conference Committee.

"The Senate bill proposed an entirely new law. It was complete in itself and repealed all previous and conflicting legislation. It provided for universal military training and a thorough federalization of the National Guard under the constitutional power to raise and support armies.

"The House bill on the other hand was an amendment to the National Defense Act of June 3d, 1916. Separate services such as construction and transportation, which the Senate bill would have established, were merged by the House bill with the Quartermaster Corps.

Bill Passed by Congress.

"The bill which was at last adopted by Congress and became a law on June 4th, 1920, was a compromise between the two bills that went to conference; and, though a compromise, marks a decided step in progress. In fact your Committee finds, as pointed out later, that under the Act there is ample provision for accomplishing what your Committee believes should be done—namely, the establishing of a thoroughly organized technical reserve whereby the services of engineers can be availed of both in time of peace and time of war, and the younger men trained to be efficient officers as against the contingency of war.

"In February, 1915, some engineers in New York began a movement looking to the utilization of the services of engineers in connection with the Army in case of war. This movement resulted in five Special Committees being appointed by the National Engineering Societies. To facilitate and co-ordinate the work of these Special Committees, a Joint Committee was organized consisting of the Chairmen of the separate Committees. This Joint Committee formulated a plan whereby there should be organized, as an integral part of the Army, an Engineer Officers Reserve Corps on the lines of the Medical Officers Reserve Corps.

"The Committee presented this project to the Secretary of War and during that year and the following discussed it at length with the Secretary, the Chief of Engineers, the officers of the General Staff and the Committees on Military Affairs of the Senate and the House. The plan was accepted in principle by the War Department, but developed by them into an Officers Reserve Corps for all arms, and into which the already existing Medical Reserve Corps was merged. The Officers Reserve Corps became a reality through the National Defense Act of June 3d, 1916.

"It is seldom that the fruits of legislation are gathered as quickly as was the case with the Reserve.

"On the declaration of war in April, 1917, only ten months after the passage of the Act constituting the Reserve, the United States Government had on hand a large number of officers already commissioned subject to immediate call, and also had the necessary machinery by which additional officers, to any number, might be and were immediately commissioned to prosecute a great war. The work that was done by the Joint Engineer Committee proved therefore of far reaching benefit.

Starting Point for Action by Committee.

"The plan that was thus created and the legislation bringing it into effect may well be the starting point for action by the Committee on Military Affairs appointed by Engineering Council.

"Since 1916, our country has had the experience of war and one lesson is that the military engineer of to-day must know more kinds of engineering than any other one class of engineer. He must not only understand the application of military engineering to purely military projects such as fortifications, ordnance and ballistics, but he must be an expert in the operation of railways and roads as well as in their construction and maintenance. He must be able to design and build

bridges capable of sustaining heavy weights, and not merely the comparatively frail structures shown in the military hand books intended only for infantry, horse-drawn vehicles and light field artillery. He must be a mechanical engineer, electrical engineer, mining engineer; be a metallurgist, a chemist, physicist and biologist, and he must be an expert topographer, map producer and photographer. In short there is no field of applied science but that takes a prominent part in military work. War has become largely a matter of engineering.

"In the recent war the number of engineer troops, including special infantry and service troops assigned to work with the engineers, exceeded 350 000 officers and men. The officers alone numbered more than 25 000, several thousand of whom were used on detached or special service not in connection with troops.

"Just so long as war is possible and the possibility is ever present, provision should be made for supplying in case of emergency the number of engineer officers that will be needed. To make them immediately available they should have had some experience in military matters as well as in the particular branches of their civil profession. In this report, the term 'civil' will be used in its original sense in contradistinction to 'military', that is, embracing all forms of engineering—mechanical, electrical, mining, as well as those branches that are by usage included in the usual acceptance of Civil Engineering.

"This country will never maintain a standing Army sufficiently large to contain the necessary number of trained engineers with which to meet the demand of a suddenly arising emergency, nor under existing conditions is it desirable. This does not mean, however, that a reasonable measure of preparedness should be neglected.

"Recent legislation, in broadening the powers of the Reserve Corps, makes it an instrument that provides the necessary machinery for preparing against any call that is likely to be made upon the United States.

"The Defense Act of June 3d, 1916, limited the operations of the Officers Reserve to time of war except only as to officers of the Medical Reserve Corps. The Reserve officers could be called into active service beyond the period of two weeks in any year when war was actual or in the judgment of the President, imminent. The joint committee of the Engineer Societies endeavored to have engineer officers placed upon the same footing as medical officers, that is, subject to call at any time and for any period except that in times of peace their consent was necessary. The Congressional committees feared that this provision might be a too radical departure from existing customs and withheld Congressional consent.

New Principle of Service Whenever Needed.

"In the Act of June 4th, 1920, however, Congress has incorporated the principle of service whenever needed as provided in Section 37*a*, as follows:

"'*Sec. 37a.—Reserve Officers on Active Duty.*—To the extent provided for from time to time by appropriations for this specific purpose, the President may order reserve officers to active duty at any time and for any period; but except in time of a National emergency expressly declared by Congress, no reserve officer shall be employed on active duty for more than fifteen days in any calendar year without his own consent. A reserve officer shall not be entitled to pay and allowance except when on active duty. When on active duty he shall receive the same pay and allowances as an officer of the Regular Army of the same grade and length of active service, and mileage from his home to his first station and from his last station to his home, but shall not be entitled to retirement or retired pay'.

"This highly important change in law opens the way by which engineers in civil life, provided they hold commissions in the Reserve, can be made use of by the Government, and the engineers themselves brought into close touch with the officers of the permanent establishment and the routine organization of the Army.

"Under the law as recently amended, the Chiefs of the Technical Services, such as the Chief of Engineers, Quartermaster General, or the Chiefs of Ordnance, Air

and Chemical Warfare Service, and the Signal Corps can call on any engineer officer of the Reserve and for any purpose whether for consultation, for investigation, even for such special duty as a lecturer at the Military Academy or Post Graduate Army Schools, on various features of Civil Engineering, for work in their own offices or under their direction. Whenever the Chief of a Technical Service is directed to undertake work of a more or less temporary character such as surveys or reports, he can now by law draw for assistance from among the Reserve officers without delay and inconvenience of civil service examinations, disbanding the staff thus organized as soon as the particular work is completed without the inconvenience of technical dismissal always embarrassing to a civilian employee. If Reserve officers should not desire the appointment at any time, or consider that any professional etiquette was violated in accepting a call that was one of civil rather than a military character, the right of refusal is amply covered by law and the officer in question would be fully justified in exercising the right.

"A similar provision has existed in the Medical Reserve Corps since its inception several years ago whereby the Surgeon General was able to increase his corps at any time to meet an emergency call, disbanding the excess staff as soon as the emergency was passed. The Surgeon General regarded the Reserve officers as members of the Medical Corps and they in turn felt themselves to be officers of the Army of the United States with the possibility of actual service and military experience with attending responsibility always before them.

"The Chiefs of the Technical Services are now given the same privilege as was heretofore possessed only by the Surgeon General, and the engineer officers of the Reserve have the same status and similar responsibilities as has always been possessed by the medical officers.

Need for Training-Camp Experience.

"The war just ended has shown that while a fairly good soldier can be developed in a very few months of intensive training, a much longer time and more extended experience than can be obtained in a training camp is needed to make a good officer. The officer must know not only the details of the drill and minor tactics, but also the care of men and the relations which should exist between officer and officer and between officer and enlisted man, what constitutes morale so far as it affects large bodies of men, the ability to obey and to command, the reasons for army regulations, that to an outsider may seem at first useless red tape—in short, to become imbued with the army spirit. It is only thus that one can learn to be a good officer and to realize that he is a small part of a great machine.

"Congress has decided that, for the moment at least, it is not wise to undertake universal training. By the above amendment to existing law the much more important detail of training officers has been introduced. Just so long as an army is necessary there must be a trained personnel and provisions made for training the personnel.

"The obtaining and training of emergency engineer officers can be readily secured through the Reserve, but if the Reserve is to form a training school and a place where efficient engineers may be held ready and drawn from as needed, whether in peace or war, it must be a real living organization.

"To attract the highest type of civilian engineer, there must be offered a commission that will not only confer nominal military rank, but one that will carry with it opportunities for service that will entail responsibility, and, when service has been well performed, such service be acknowledged and rewarded by an advance in rank. In addition to the opportunity for purely professional engineering service which as suggested above can be obtained by the assignment of Reserve officers to work under the Chiefs of Technical Services, it would be highly beneficial and undoubtedly attractive to younger men if in addition to temporary assignments to engineer duty, at least the opportunity were presented for the assignment to duty with the artillery or infantry for a period of at least one year.

Such appointment would give experience with troops in the field, and experience so absolutely necessary for the proper training of officers.

"There are and will be, it is believed, many young men who on the completion of their college course and without definite plans, would be glad to accept such an appointment with a possible career in view. Such men, especially if they have had National Guard experience or had taken military training as part of their collegiate course, would make excellent material from which to develop officers for the permanent establishment.

"An Engineer Officer Reserve organized and administered along such lines under the provisions of existing law, would furnish the necessary machinery to train and develop a great body of young engineers to form a nucleus immediately available for a large corps should the emergency arise. At the same time the Reserve could enroll the older engineers whose services as advisers and experts would be valuable in time of peace and so very precious as administrators or directors in time of war.

Military Engineers Need Opportunities in Civil Engineering.

"But the bringing together of the two great divisions of engineering science, military and civil, is only partly done when there is extended to civilian engineers the opportunity for gaining experience as military engineers. The full result will be attained when the military engineers in a corresponding manner are given the opportunity to become experienced as civil engineers. To enable the members of the Corps of Engineers to gain experience in all branches of Civil Engineering, they should have opportunities for service on as much as possible of the general construction work done by the Federal Government, and not be confined to River and Harbor Improvements, as has been the custom. In addition to this, members of the Corps should be assigned for temporary employment with State highway commissions or private corporations such as railway companies, metallurgical establishments, large contracting firms or factories where machinery, electrical devices and other forms of manufactured articles, in which engineers are interested, are produced and where members of the Corps can become acquainted with all phases of practical operation.

"Not even the best technical schools, where the course of four years follows a previous collegiate education of at least two years, can do more than give the students the rudiments of theoretical training. How much less, therefore, can the Military Academy, where the larger part of the course is necessarily devoted to subjects other than engineering, turn out broadly trained engineers with practical experience?

"The War Department has established line and staff schools where officers can take post-graduate courses in military subjects. The opportunity herein suggested would provide the corresponding post-graduate courses for engineers, and on the soundest basis.

"Your Committee believes that arrangements can be made without difficulty whereby officers of the technical services would be received as members of the operating staffs of transportation companies and engineering corporations. The advantage in thus broadening the experience of army engineers in fields of which they must know much in times of war are obvious. If while they are temporarily withdrawn from military duties there are insufficient engineers to meet the requirements of the War Department, the advantage would be presented to give junior officers the experience of exercising judgment and assuming authority at an age much earlier than would otherwise be the case, while the temporary vacanies in lower grades could be filled by assignments from the Reserve. Should some officers, after trying work in civil life, decide to remain in the new field of employment, the Army and the country would be the gainers. Permanent promotion would be accelerated, a most desirable thing in time of peace, and

there would be added to the Reserve, ready for call in case of war, engineer officers well trained in military knowledge.

"We therefore recommend that the question of the proper utilization of engineer officers and the means to adopt whereby the best type of engineers from civil life can be attracted, to be taken up with the Chiefs of the Technical Services, where the power of initiative lies. The present moment appears to be highly propitious. For nearly two years engineers from civil life, some holding temporary commissions as officers of the army, others still retaining civil status have worked with the officers of the Corps of Engineers and other Technical Services, both in the United States and in the field in France. There exists as never before a mutual respect between the officers of the Technical Corps of the Army and the great body of professional engineers, based on close intimacy and common service. That mutual feeling possesses a great force of latent momentum. Before it is dissipated by time it should be intelligently directed for the better service of the country.

"Respectfully submitted,
(Signed) "WM. BARCLAY PARSONS, *Chairman.*
"GEORGE D. SNYDER, *Secretary.*"

Notes from National Service Committee

ENGINEER APPOINTED ON POSTAL ADVISORY COMMITTEE.

Following a recommendation by Engineering Council, Mortimer E. Cooley, M. Am. Soc. C. E., of the University of Michigan, was made a member of the Postal Advisory Committee. Dean Cooley is also Past-President of the American Society of Mechanical Engineers, and Past-Director of the American Society of Civil Engineers.

This Advisory Committee is assisting the Senate and House Joint Post Office Committee in their investigation of the postal system. It was considered wise to have an engineer on the Advisory Committee because of the engineering work which it will have to do, such as the construction of mail tunnels, mail tubes, and other mail transportation and handling devices.

It was recently decided that a firm of consulting engineers should be called in to do statistical work and make recommendations to the Advisory Committee. For the purpose of selecting such company, the Post Office Committee met with the Advisory Committee in Chicago, Ill., and while the final selection of the consulting engineering company has not been made, it was left in the hands of the Chairman with recommendations.

This is another step in the selection of engineers by the Government to fill important positions in work that is closely allied with, or involves, engineering.

TECHNICAL WORK AT THE U. S. BUREAU OF STANDARDS.

Recent bulletins issued by the Bureau of Standards cover the progress of experimental work that has been started there. The titles of those that are of especial interest to engineers are as follows:

Permeability of Concrete; Investigation of Combination of Aluminous and Silicious Bond Clays Used in Making of Crucibles; National Electrical Safety Code; Method for the Accurate Measurement of the Interior Diameter of Ring Gauges; The Use of Etched Balls in the Brinell Test of Hardened Steels; Prop-

erties of Boiler Plate at Elevated Temperatures; Test of a Section of a Cast-Iron Heating Boiler.

Because of the current nature of these investigations, the results are not generally printed, but complete data on all work to date are always obtainable through the National Service Department or from the Bureau direct.

EUROPEAN NOTES

The following notes relative to reconstruction, etc., in Belgium and France, and industrial progress, etc., in Great Britain and elsewhere, have been contributed by W. E. Woolley, Assoc. M. Am. Soc. C. E., of London, England, who is also a Corresponding Member of the Société Centrale d'Architecture de Belgique.

£3 000 000 Housing Scheme at Hampstead

A £3 000 000 housing scheme is being rapidly developed at Hampstead by the Co-partnership Tenants, Ltd., the pioneers of the "Garden Suburb." An area of 350 acres has been planned for the erection of 3 000 houses. From Finchley Railway Station a light railway 3 miles in length has been constructed to convey material. A well on the land supplies all the water that is required. Roads and sewers had been completed before the war.

The operations already carried out by the Co-partnership Tenants on the Hampstead Garden Suburb afford a guaranty that the work on the new estate will be well done. Houses suitable for all classes stand amid a bower of flowers and greenery. Happy children revel in the big open spaces. Indeed, many of the dwellers in the suburb spend their holidays at home, and take their pleasure in their own gardens and in the playing fields, which offer tennis, croquet, golf and cricket.

The new estate will embody all these advantages. Over 20 acres of beautiful woods are to be preserved, together with a playing field of 21 acres. By careful planning, the streets are arranged so that wheeled traffic is confined to the main thoroughfares. This leaves the others free for the children to play in, and also insures quietude.

Plans of City and South London Railway

Lord Ashfield, in the *Evening News,* London, indicates the intimate relationship between the impending increases in underground fares and the worthy development of activities in relieving the congestion of London. He examines the effect upon congested streets of spending about £6 000 000 on immediate improvements, of which not the least important is the enlargement of the City and South London Railway, pioneer of the "Tubes."

At present the platforms of this line can only take a train of five small cars with thirty-six passengers in each. If, as is perfectly feasible, by the system of electrically controlled automatic signaling, the capacity of the City and South London be brought up to forty trains an hour in one direction, that Railway, even as it is to-day, would be taking from the traffic-ridden thoroughfares above ground 7 200 passengers an hour.

Very soon, however, it will carry almost twice as many men and women, or, with 50% standing, a total of more than 20 000 passengers an hour. To do this, the roof of the existing tunnel, which is an experimental one with a gauge of only 10 ft. 2 in., must be raised and the tunnel enlarged throughout to the standard gauge of 11 ft. 8¼ in., thus admitting standard cars, seating forty-eight passengers instead of thirty-six.

Lastly, by extending the present platforms to take seven cars in place of five, each of the forty trains an hour will, without reckoning strap-hangers, carry 336 passengers.

It is not a big total compared with New York City, where they have trains of ten cars carrying 900 men and women at a time, yet in London it is an ideal still to be won not only here, but on the Bakerloo section of the London Electric Railway, where only trains of five cars can be accommodated, and on the later sections of the same railway, which take six.

New Arch to Support Crystal Palace Dome

For nearly 70 years—since 1854—the vast central arch of glass at the Crystal Palace has remained more or less in its original state, defying time and the weather.

Recently, however, it was considered advisable to strengthen this particular structure. The Engineering Staff has accordingly put up a series of steel columns to a height of 120 ft., to carry steel girders 90 ft. long. Further steel supports on top of these carry the total height to 180 ft. Over 80 tons of steel have been used in this work.

BRIEF NOTES

A floating repair dock, capable of taking vessels 300 yd. long, has been successfully launched at Havre. It is said to be the largest structure of its kind.

An aerial service between Paris and Strassburg, to be covered three days each week, has been inaugurated. A service from Strassburg to Prague and a line from Prague to Warsaw have also been started.

The Interstate Commerce Commission on September 30th, 1920, approved a loan of $3 000 000 to the Baltimore and Ohio Railroad Company, to aid it in making additions and betterments to its way and structures in order to promote the movement of freight trains.

During the month of September, 1920, tolls amounting to $1 010 166 were collected from ships using the Panama Canal. This is the largest amount collected in one month since the opening of the Canal.

According to Adjutant General Harris, Army recruiting again broke all peace-time records during August, 1920, showing acceptances for the month to have reached 19 209. July acceptances, which were slightly larger than the number in June, were 15 821.

Reports received at the Bureau of Steam Engineering of the U. S. Navy regarding experiments conducted off the Virginia capes with the battleships *Ohio*

and *Iowa,* just completed, prove that 12 000 and 13 000-ton battleships can be successfully maneuvered by radio from land stations operating directly upon the steering gear at considerable distances.

The Federal Trade Commission has decided to hold a re-hearing of the complaint recently brought before it by the Western Association of Rolled Steel Consumers, against the U. S. Steel Corporation. The re-argument will begin November 15th, in which Western steel fabricators will make another effort to prevent the use of Pittsburgh as a basing point for steel prices. The last hearing resulted in a decision in favor of the U. S. Steel Corporation.

The War Department issued a statement on the organization of the new Army. Under this plan, the first line will consist of a Regular Army of 300 000 officers and enlisted men; the National Guard with 435 000 officers and men will form the second line. Finally, a vast reserve force, for which 70 000 officers have already been appointed and 12 000 more are under consideration, will be formed.

During the financial year ending March 31st, 1919, England spent £974 033 762 for her Army, £356 044 688 for her Navy, and £85 445 084 for her Air Force. In the succeeding fiscal year, which closed on March 31st, 1920, her expenditures for military and naval forces were reduced by £678 287 808. The effort of the British Government, upon entering the present financial year, has been to return as nearly as possible to the old peace military and navy standing.

The foreign trade of the United States for 1920 will approximate $14 000 000 000, according to estimates compiled by the National City Bank. This total compares with $11 000 000 000 in 1919, $9 000 000 000 in 1918 and 1917, slightly less than $8 000 000 000 in 1916, slightly more than $5 000 000 000 in 1915 and about $4 277 000 000 in 1913, the year immediately preceding the war. Manufactures continue to be the outstanding feature of this foreign trade. They form 52% of the exports in the current calendar year, and in May and June were 56%, as compared with 43% in the corresponding months of 1919. The estimated total value of manufactures exported in 1920 will not only be the largest it has ever recorded, but will substantially exceed $4 000 000 000 while in 1914, they amounted only to a little more than $1 000 000 000.

ACTIVITIES OF LOCAL SECTIONS*

Ninety-Second Regular Meeting of San Francisco Section

The topic of the evening at the ninety-second regular meeting of the San Francisco Section, held at the Engineers' Club on August 17th, 1920, with about 55 members and guests present, was "River and Harbor Improvements on the Pacific Coast", presented by Col. Eveleth Winslow, Corps of Engineers, U. S. A. He discussed the protection of harbor entrances in general, citing as an example the work at Humboldt Harbor, which he described in some detail. In discussing the needs of San Francisco Harbor, he emphasized the necessity for greater depth over bars in an open roadstead where rough seas may be expected. The depth over the bar outside the Golden Gate is 32 ft., although there are channels with a minimum depth of 40 ft. He pointed out that as far back as records go there has been practically no shifting of the bar, so that a wide and deep channel dredged in a convenient location could be expected to remain without heavy maintenance expense.

The discussion, participated in by Messrs. C. E. Grunsky, L. R. McWethy, E. F. Haas, C. J. Rhodin, and F. B. Smith, brought out additional information as to possible improvements to the entrance of San Francisco Harbor. A survey of the bar is already arranged to be carried out this fall, using Federal funds and suitable deep-sea equipment. It was pointed out that a demand for the construction of a channel across the bar must come from commercial interests, rather than military or naval authorities. The bar is only about ½ mile wide at the narrowest point, and hence it would not be difficult or expensive to dredge a deeper channel across it. Mr. Grunsky suggested that it would be proper to take action in bringing influence to bear in an effort to obtain a Federal appropriation for this work, and it was agreed to lay the situation before the San Francisco Engineering Council with the recommendation that it take such action as might be deemed advisable.

It was reported that the necessary two-thirds vote of the membership on the question of change of name from "Association" to "Section" had been received, the official name now being "San Francisco Section, American Society of Civil Engineers."

Mr. Grunsky reported that the Committee on the organization of a California Engineering Council was being delayed somewhat by the fact that the Los Angeles engineers have returned the proposed draft of the Constitution without approval.

Mr. J. H. Brunnier moved that a vote of thanks be sent to the Portland Section for the effective demonstration it made at the Annual Convention of the Society that the West knows how to entertain such a meeting.

Mr. McWethy extended an invitation to visit the Government Island Shipyard where tests are being conducted on a concrete boat, mentioning a test of a 44-ft. head of water on a 4-in. concrete slab and a 17½-ft. head on the under side of 2½-in. deck slabs to see if they would pull away from the beams.

President Davis Addresses San Francisco Members

At a special luncheon meeting of the San Francisco Section held August 6th, 1920, President Arthur P. Davis was entertained as guest; and, although but a

* For list of Local Sections, Officers, Meetings, etc., see page 812.

short time was available in which to notify the members, the assembly room of the Engineers' Club was crowded to hear him. Mr. T. H. Means, acting as Chairman, introduced President Davis, who spoke of the proper functions of the Society, as he understood them. He mentioned particularly its relations with other technical societies, saying that the Society should not confine itself solely to the consideration of technical papers, but should take an active part in the consideration of all questions vitally affecting engineers, even though not strictly technical. He stated that unless this broader field of endeavor is entered, the Society cannot expect to hold the prestige of which it is at present so justly proud.

As an instance in which this function of the Society might have been brought into play, President Davis cited the controversy over the choice of a route for what is now the Panama Canal. Public opinion was strongly in favor of the alternate Nicaraguan Route, but a small board of engineers, firmly convinced that the Panama Route was the only one feasible, courageously opposed public opinion and, supported by one United States Senator, finally won its point. President Davis felt that the United States was thus barely saved from committing a serious blunder, and stated that if this board of engineers had then been supported properly by the Engineering Societies, the danger would have been greatly minimized.

Referring to various other associations of engineers and the fields in which they function, President Davis mentioned particularly the American Association of Engineers and its rapid growth and aggressive tactics in securing greater compensation for engineers. However, he felt that such an association could never properly represent this Society in welfare or other work, since the membership was, and always would be, different.

President Davis then spoke of the prosecution of public work by the Government, drawing on his own experience in the Reclamation Service, saying that it was a mistake to hold that governmental operation can never be as efficient as private operation. Just because it may not have been efficient in the past is no proof that in the future, with the right men in positions of authority, governmental operation of certain public enterprises will not prove to be as efficient and economical as private operation. All engineers should realize their responsibility as citizens to see that only competent men are put in positions of authority. While not advocating governmental ownership or operation of public works in general, he said his position had changed from that of former years, and he felt that governmental operation would so necessarily come for certain work that the problem now was to prevent public demand from forcing government ownership, operation, or supervision into fields where private interests function best.

The meeting adjourned immediately at the conclusion of President Davis' address.

Pittsburgh Section Approves Constitutional Amendments

On motion, duly seconded and carried, the regular meeting of the Pittsburgh Section, held at the Hotel Chatham on September 8th, 1920, with 26 members present, approved the proposed amendments to the Constitution of the Society as submitted, following a discussion participated in by Messrs. R. Khuen, Jr., T. J. Wilkerson, L. W. McIntyre, R. A. Cummings, and P. W. Price. It was also voted to instruct the Secretary to send a letter to all Local Sections of the Society and

to the members of the Pittsburgh Section informing them of the foregoing action in regard to the constitutional amendments.

Secretary Schein read a communication from the Department of City Planning, City of Pittsburgh, relative to the establishment of districts according to permitted character of uses of buildings. It was moved, seconded, and carried that a committee of three be appointed by President Knowles to review the report of the Planning Commission, call on it for information, and report at the next regular meeting of the Section.

A communication from Acting Secretary H. S. Crocker relative to the redistricting of the Society was read. After discussion, it was moved, seconded, and carried that the Secretary inform the Board of Direction of the Society that the Section is wholly in accord with the plan proposed, so far as District No. 6 is concerned.

Mr. R. A. Cummings addressed the meeting on the proceedings at the Portland Convention, and was given a vote of thanks.

Messrs. R. Khuen, Jr., J. D. Stevenson, T. J. Wilkerson, W. M. Judd, and L. W. McIntyre were appointed as a Nominating Committee to present the names for officers of the Section. This Committee later nominated N. S. Sprague for President, P. L. Wolfel for Vice-President, and Nathan Schein, for Secretary.

Special Meeting Considers Case of Highway Commission.

At a special meeting of the Pittsburgh Section held on September 14th, 1920, for the purpose of considering the published reports of the contemplated removal of the Allegheny County Highway Commissioner, the following resolution was passed:

"Whereas: It has been reported that the Commissioners of Allegheny County have demanded the resignation of a competent engineer from the office of County Road Commissioner for reasons so far unassigned, and

"Whereas: It is the sense of this meeting that the office should be filled by a technically trained engineer;

"Therefore: Be it resolved that a committee be instructed to wait upon the Board of Commissioners and present to it our formal protest against the appointment to or the retention in the said office of any person other than a competent highway engineer as aforesaid."

This Committee was later received by the Allegheny County Commissioners, who did not, however, heed the protest, but appointed a man who was not an engineer.

The Pittsburgh Section gave an informal dinner in honor of President Arthur P. Davis, Vice-President R. A. Cummings, and Director Willard Beahan on September 29th, 1920, at which 46 members were present. Addresses were made by the honor guests, and by President Knowles and Mr. George S. Davison, all of which related to the pending amendments to the Constitution of the Society.

Duluth Section Also Approves Constitutional Amendments

On motion, duly seconded, and carried, the meeting of the Duluth Section held on September 20th, 1920, with 18 members and 1 guest present, approved the proposed amendments to the Constitution of the Society, as submitted, and

ordered that copies of the record of such action be sent to all Local Sections. Letters from the Pittsburgh Section and the Detroit Section advising that at meetings recently held it had been voted as the consensus of opinion of the members present that these constitutional amendments be approved, were read.

Messrs. E. K. Coe and W. H. Woodbury made a preliminary verbal report for the Committee recently appointed to consider the compensation of engineers. At President Clark's request, a written report is to be submitted at the next meeting.

Secretary Zimmermann read an article recently written by F. T. Llewellyn, M. Am. Soc. C. E., on the subject "Steel in Construction". This article, written at the solicitation of the Illinois Society of Architects to be used in the Year Book of that Society, was greatly enjoyed by all present. It was moved, seconded, and carried that a letter of appreciation be sent to Mr. Llewellyn.

Northwestern Section Elects New Officers

At the twenty-seventh regular meeting and the Sixth Annual Meeting of the Northwestern Section, held at the St. Paul Athletic Club on September 17th, 1920, with 19 members present, President H. E. Stevens presiding, the following new officers were elected:

President, Charles L. Pillsbury; First Vice-President, W. C. Armstrong; Second Vice-President, W. T. Walker; Secretary, Paul C. Gauger; Treasurer, F. W. Bass.

The outgoing officers, by formal motion, were extended a vote of thanks for their work during the past year.

It was requested that the Secretary send notification of the election of Mr. P. E. Thian as the representative of the Northwestern Section on the Minnesota Joint Engineering Board.

Mr. W. L. Darling made a brief report regarding the work of the Committee on Jurisdictorial Awards, which cleared up the matter materially, but as some members wished further information, it was duly moved, seconded, and carried that the Chair appoint a committee of five to study the matter in more detail and to report at the next meeting. The Chair appointed on this Committee Messrs. W. L. Darling, Paul C. Gauger, L. P. Wolff, G. L. Wilson, and W. T. Walker.

The question of redistricting the Society was briefly explained by President Stevens, and letters from the Acting Secretary and from the Duluth Section were read. It was moved, seconded, and carried that the Northwestern Section indorse the objections of the Duluth Section in regard to District No. 7, and that the Secretary be instructed to write to Acting Secretary H. S. Crocker that the Committee on Redistricting be requested to revise its recommendations in order to make District No. 7 more compact.

Mr. W. C. Armstrong, Chairman of the Local Section Committee for collecting funds in support of the Jones-Reavis Bill, reported that to date he had collected $333.50 of the $400 pledged by the Section.

Proposed Amendments to Constitution Discussed.

President Stevens made a clear and detailed report on the proposed amendments to the Constitution. This report was followed by live discussion in which every member present took part, the opinion of most members being that the

amendments should be carried. Upon motion, duly seconded, President Stevens was extended a vote of thanks for his clear and comprehensive presentation. Mr. Horace E. Stevens then offered the following resolution:

"Resolved: That the Northwestern Section of Members of the American Society of Civil Engineers approve the spirit of the proposed amendments, but advise their rejection for the purpose of revision and co-ordination."

This motion was lost, and on motion, duly made, seconded, and carried, the Secretary was instructed to have copies of President Stevens' report printed and mailed to all members of the Northwestern Section, to the Parent Society, to all other Local Sections, and to the technical press.

It was moved, seconded, and carried that the members present were favorable to holding future meetings at the University of Minnesota without a dinner preceding the business meeting. It was also moved, seconded, and carried that the President be requested to call a special meeting of the Section not later than two weeks from date to discuss the proposed Minnesota Federation of Architects and Engineers and the proposed License Bill.

President Stevens spoke briefly on the problems facing the Society and the work accomplished during the past year.

Special Meeting of the Southern California Section

On September 22d, 1920, a special meeting of the Southern California Section, with 47 members and 26 guests present, was held at the University Club. President Barnard introduced as guests Messrs. J. S. Nickerson of the Imperial Irrigation District and Frederick N. Cronholm, Manager of the same District; Luis Guerrero Romero, of the Lower California Irrigation District and J. Stewart Ross, Attorney for the same; R. D. Goodrich; F. H. Fowler, of the U. S. Forest Service of Northern California; Francis L. Sellew, formerly of the U. S. Reclamation Service; and H. C. Mower, all of whom responded briefly.

Mr. J. C. Allison gave an address on the subject "Final Solution of the Irrigation and Flood Control Problem of the Lower Colorado River", illustrated by carefully prepared maps and many interesting views taken from an aeroplane. The subject was discussed by Messrs. Francis N. Sellew, who had assisted Mr. Allison in the preparation of a report covering the subject-matter of the address, J. B. Lippincott, George G. Anderson, H. W. Dennis, S. A. Jubb, W. D. Smith, C. E. Tait, and A. L. Sonderegger. The thanks of the Section was extended to Mr. Allison.

Mr. H. Hawgood read a letter from Acting Secretary H. S. Crocker in regard to the National Board for Jurisdictional Awards in the Building Industry, stating that the Society is not a party to that organization.

Mr. Anderson carefully explained the details of the work of the Committee on Development, and the events leading up to the submission of the proposed amendments to the Constitution of the Society, to be canvassed on October 6th, 1920. Mr. Anderson pointed out the urgent necessity of a full and representative vote on these important amendments and urged all to send in their ballots.

Seattle Section Entertains President Davis

The Seattle Section gave a dinner on September 17th, 1920, in honor of certain members of the Society who had attended the Annual Convention, held in Port-

land, Ore., and to President Arthur P. Davis as the special guest of honor. There were 32 members and 25 guests present. Vice-President Carl H. Reeves presided and introduced President Davis, who gave an exceptionally clear explanation of the history and true intent of the recent questionnaire, and also of the proposed activities of the Federated American Engineering Societies.

Mr. D. C. Henny discussed in detail the appeal hurriedly gotten out and signed by a few members requesting a negative vote on the questionnaire. Mr. Henny stated that this matter had been considered by the Portland Section and with President Davis and that a reply thereto would shortly be mailed. The subject was discussed briefly by Messrs. F. C. Emerson, Marvin Chase, R. K. Tiffany, E. M. Chandler, A. J. Turner, P. A. Cupper, O. Laurgaard, S. H. Hedges, and J. C. Ralston.

ENTERTAINMENT OF VISITING MEMBERS.

Members of the Seattle Section on August 13th, 1920, entertained about 40 visiting members of the Society on their way home from the Annual Convention. Breakfast was served at the Engineers' Club, after which a short address of welcome was given by Vice-President Carl H. Reeves, and Mr. L. M. Grant, Chairman of the Special Entertainment Committee, outlined three automobile trips for the entertainment of the guests. Thirty-four chose the trip to Lake Tapps or Snoqualmie Falls; three chose the trip over the Seattle Boulevard and Park Systems under the personal direction of Park Engineer McGillis; and two chose the trip to inspect the port facilities, personally conducted by the Chief of Port Commission, George F. Nicholson, M. Am. Soc. C. E.

Federation Endorsed at Annual Meeting of Philadelphia Section

The Annual Meeting of the Philadelphia Section of the American Society of Civil Engineers held at the Engineers' Club on October 4th, 1920, President S. M. Swaab in the chair; H. T. Shelley, Secretary, and present, also, 30 members, considered the desirability of the Society becoming a Charter Member of the Federated American Engineering Societies. Mr. Richard L. Humphrey spoke ably in behalf of this movement and presented a resolution in favor of the measure, which was adopted, as follows:

"Whereas: The need for a comprehensive organization that can speak for the engineering and allied technical professions, in matters of public welfare where engineering experience and technical knowledge are involved, as well as in matters of common concern to these professions, was emphasized—

"1.—By the recent war, and led to the formation of Engineering Council by the four Founder Societies,

"2.—By the Joint Conference Committee's unanimous report to these Societies, and

"3.—By the unanimous action of the Washington Organizing Conference in creating the Federated American Engineering Societies and American Engineering Council, and

"Whereas: The Federated American Engineering Societies is already in existence and has fifteen Charter Members, making it the largest engineering organization in the world, and

"Whereas: Engineering Council has unanimously endorsed the formation of the Federated American Engineering Societies and American Engineering Council,

and is arranging to transfer its activities to American Engineering Council on or about January 1st, 1921, and

"Whereas: The American Society of Civil Engineers participated in the organization of Engineering Council and has financially supported it for more than three years in its efforts 'to provide for consideration of matters of common concern to the engineer, as well as those of public welfare in which the profession is interested, in order that united action may be possible',

"Therefore, Be It Resolved: That the Philadelphia Section of the Society, in Annual Meeting assembled, October 4th, 1920, hereby endorses the Federated American Engineering Societies and American Engineering Council, and recommends to all Corporate Members of the Society, especially those resident in the District No. 4, that they vote 'yes' for the questionnaire ballot to be canvassed November 8th, 1920, to the end that the American Society of Civil Engineers shall become a Charter Member of the Federated American Engineering Societies, and

"Be It Further Resolved: That copies of this resolution be sent to the Secretary of each Local Section of the Society, to the technical papers, and to each Corporate Member of the Society resident in the Fourth District."

The Secretary presented the annual report, containing the customary financial statement and recommending action be taken on several items of particular importance to the Section. The report was approved. The new rate adopted by the Engineers' Club for determining the annual dues to be paid by the affiliated Societies was approved. It was also unanimously voted that the name of the Philadelphia Association of Members of the American Society of Civil Engineers be changed to the Philadelphia Section of the American Society of Civil Engineers as recommended by the Board of Direction of the Society. As the report showed a deficit, on account of the unusual activities of the Section, it was voted that those members so disposed make an advance payment of dues for the year 1921.

The Secretary read the report of the Tellers, Messrs. George S. Frost and George S. Webster, and announced that the 66 ballots received were marked for the same candidates. The President then declared the following officers elected: President, John Meigs; Vice-President, Charles F. Mebus; Directors, Charles D. Conklin, Jr., and Charles F. Puff, Jr., and Secretary, H. T. Shelley.

Mr. Swaab, in turning over the Presidency to his successor, addressed the meeting as follows:

"In turning over the gavel to my successor I wish to make a frank statement which may assist him in the performance of the duties of his position.

"We take it for granted that we are going to cast off our fetters and that henceforth and forevermore we are to be free and that the Society is soon to enter on a broader and more comprehensive field of endeavor, which has as its main object to place the entire Engineering Profession before the public in a better light 'by making the Society an active force in economic, industrial and civic affairs,' and also by the medium of the principle of self-determination provide a more varied activity than in the past, as may be deemed best in the interests of each individual unit of the Society.

"With this object in view the following decalogue is presented:

"1.—Outline a policy for the conduct of the Society for the coming year.

"2.—Dominate the policy, whatever it is, or it may dominate you.

"3.—Have the Board support your policy or amend it so that all can give it the necessary support.

"4.—Make the meetings interesting as well as instructive. This may not be an easy thing to do, but it is not alone desirable for the best interests of all concerned but is absolutely necessary to insure success.

"5.—Do not just go along—it does not land you anywhere.

"6.—Be original; be honest; be consistent; be brave, and above all else be aggressive, *a la* Humphrey.

"7.—See to it that the Philadelphia Section sets an attainable goal for itself and then go after it and make it.

"8.—See to it that there is more good fellowship in our meetings and let the members be useful one to the other, not mere passing acquaintances.

"9.—If the members require inducements to come to the meetings, provide it in their quality, rather than in the number of meetings, which should be restricted.

"10.—Adjourn the meetings so that a fellow member will always get home the same day, rather than the day after, which will remove the usual restraint."

President Meigs, on taking the chair, in a short address thanked the members for the honor conferred upon him and introduced the speaker of the evening, Mr. Paul Whitham, Trade Commissioner of the United States Department of Commerce, who addressed the meeting on "Engineering Observations in the Orient", illustrating his talk with lantern slide views of China and the Philippines. His address was one of the most interesting ever given before the Section, exceedingly instructive to any one interested in commercial expansion. The speaker gave a different impression of China, its needs and its possibilities for development, than is generally current, and described the field open to the engineer, as well as the financier, in the Far East.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

FUTURE MEETINGS

November 3d, 1920.—8.00 P. M.—This will be a regular business meeting of the Society. A paper by J. A. L. Waddell, M. Am. Soc. C. E., entitled "Creeping of Railroad Rails", will be presented for discussion.

A synopsis of this paper is printed in this number of *Proceedings*.

SECOND MEETINGS OF THE MONTH

Under authority given by the Board of Direction at its meeting of August 9th, 1920, the Acting Secretary has made an arrangement with the New York Section whereby the latter will take over the second meeting of the month, and will thus hold its own meetings on the third Wednesday of each month.

The programmes contemplated by the New York Section are similar to those heretofore offered by the Society's Committee on Second Meeting of the Month, and it is understood that all members of the Society are invited to attend the meetings regardless of whether or not they may be members of the Section. This arrangement gives each member the same privilege of attendance at meetings which he has heretofore enjoyed, and is deemed especially desirable since there has been considerable doubt as to the attendance that might develop at the several meetings if three were held in each month.

LIST OF NOMINEES FOR THE OFFICES TO BE FILLED AT THE ANNUAL ELECTION, JANUARY 19th, 1921

The following list of nominees for the offices to be filled at the Annual Meeting, January 19th, 1921, received from the Nominating Committee, was presented to the Board of Direction at its meeting on August 9th, 1920. The list has been mailed to all Corporate Members:

For President, to serve one year:

GEORGE S. WEBSTER, Philadelphia, Pa.

For Vice-Presidents, to serve two years:

ANDREW M. HUNT, New York City
EDWARD E. WALL, St. Louis, Mo.

For Treasurer, to serve one year:

OTIS E. HOVEY, New York City

For Directors, to serve three years:

JOHN P. HOGAN, New York City.....District No. 1
IRA W. MCCONNELL, New York City.....District No. 1
RICHARD L. HUMPHREY, Philadelphia, Pa.....District No. 4
BAXTER L. BROWN, St. Louis, Mo.....District No. 9
FRANK T. DARROW, Lincoln, Nebr.....District No. 10
GEORGE G. ANDERSON, Los Angeles, Cal.....District No. 11

MEMOIRS OF DECEASED MEMBERS

An examination of the records of the Society has disclosed the fact that no memoirs of deceased members have been published for 546 persons who had been connected with the Society, some of whom had held high positions and been especially active in its affairs. As it is considered that *Transactions* should contain a memoir of every deceased member, a list of all cases for which no memoirs have been received, up to September 1st, 1920, is here published for the purpose of gaining the assistance of the membership in obtaining data to complete the Society records. Although in numerous cases data for memoirs or the memoirs themselves, have been promised, yet the material has never been received. The more recent cases for which memoirs have been definitely promised are indicated by footnotes.

It is earnestly requested that members who have any information or notes, however brief, which will be of value in the preparation of memoirs, will forward them to the Acting Secretary. This request applies especially to the date of death in those cases where such date is unknown, as shown by the subjoined list. It also applies to recent deaths, and it is hoped that in the future such information will be sent to the Society just as soon as the announcements of deaths are made.

Members.	Date of Death.	Members.	Date of Death.
Abbott, Arthur V.	Dec. 1, 1906	Bartlett, Winthrop.	Jan. 16, 1899
Adams, Julius W.	Dec. 13, 1899	Bassell, Burr.	Feb. 25, 1905
Ainslie, James W.	Sept. 13, 1902	Batterson, James G.	Sept. 18, 1901
Albree, Ralph.	Feb. 16, 1914	Beach, Robert J.	Feb. 7, 1916
Allen, Calvin H.	July 13, 1918	Bean, Paul J.	Jan. 25, 1919
Allen, Charles A.	Dec. 9, 1912	Beardsley, Arthur.	Unknown
*Alvarez Salas, Rafael.	June 30, 1920	Beckler, Elbridge H.	Aug. 26, 1908
Ambrose, William C.	Jan. 3, 1908	Bell, James R.	Aug. 8, 1913
Argollo, M. de T. e.	May 14, 1916	Bement, Robert B. C.	May 7, 1920
Armington, James H.	Oct. 14, 1906	Bennett, Frederick W.	Jan. 8, 1912
Armstrong, Robert S.	July 15, 1918	Bentley, Henry A.	May 13, 1889
Arthur, William Y.	Feb. 15, 1876	Benyaurd, Wm. H. H.	Feb. 7, 1900
Ashmead, Percy H.	Nov. 11, 1919	Berg, Walter G.	May 12, 1908
Asserson, Peter C.	Dec. 6, 1906	Bergengren, F. C. A. G.	Aug. 8, 1904
Ayres, Rowan.	Aug. 13, 1912	Berquist, Axel S. F.	Oct. 6, 1915
		Birks, Arthur H.	Aug. 29, 1907
Bacon, John W.	Feb. 27, 1907	Bishop, George H.	Aug. 20, 1909
Baier, Julius.	May 8, 1905	Blake, Edward J.	May 29, 1902
Baker, *Sir* Benjamin.	May 19, 1907	Blatchford, Eliphalet W.	Jan. 25, 1914
Baldwin, William H.	Mar. 6, 1917	Blickensderfer, Jacob.	Feb. 26, 1899
Ballard, Robert.	Nov. 22, 1912	Bloss, Richard P.	May 22, 1916
Bandy, James M.	Unknown	Bogart, John.	April 25, 1920
Bannister, Charles K.	Jan. 10, 1901	Bogart, Samuel S.	May 29, 1913
Barber, Amzi L.	April 18, 1909	Bogue, Virgil G.	Oct. 14, 1916
Barnes, Edward H.	May 15, 1915	Boller, Alfred P.	Dec. 9, 1912
Barnes, Oliver W.	Nov. 14, 1908	Both, Carl C. A.	Jan. 12, 1906
Barnsley, George T.	Oct. 23, 1909	Bouton, Nathaniel S.	April 3, 1908
Barr, Jacob N.	May 15, 1904	Bowie, Augustus J.	May 20, 1917

* Memoir promised but not yet received.

Members.	Date of Death.
Bowman, Joseph H. . . .	Unknown
Bradbury, Henry R. . . .	July 3, 1901
Bradford, William.	Nov. 23, 1917
Breen, Howard.	Feb. 14, 1909
Bridgford, John.	Mar. 8, 1898
Briggs, Roswell E.	May 5, 1911
Brown, Alba F.	April 22, 1906
Brown, Charles I.	Mar. 23, 1899
Brown, Charles O.	Mar. 10, 1918
Brown, John G.	Oct. 22, 1917
*Brown, William M.	May 29, 1920
Browne, William R.	Sept. 3, 1908
Bruner, Daniel P.	Aug. 29, 1901
Brush, Charles B.	June 3, 1897
Buchholz, Carl W.	Oct. 20, 1912
Buckwalter, Harris D. . .	May 12, 1918
Buffinton, Benjamin T. .	July 6, 1914
Burbank, George B.	Feb. 29, 1920
Burden, Henry.	Jan. 19, 1871
Burden, James A.	Sept. 23, 1906
Burns, Robert B.	June 21, 1906
Burrowes, Francis S. . . .	Feb. 15, 1909
Campbell, Duncan H. . .	Mar. 29, 1914
Canney, Jay C.	Sept. 15, 1917
Card, William W.	April 4, 1903
Cartlidge, Charles H. . .	June 14, 1916
Cartwright, Robert.	June 4, 1905
Catt, George W.	Oct. 8, 1905
Cheever, Albert S.	Feb. 17, 1913
Cheney, Nathaniel.	June 29, 1901
*Christian, George L. . . .	April 25, 1920
Christie, James.	Aug. 24, 1911
*Christophers, R. G.	Oct. 13, 1918
Clark, John H.	Oct. 13, 1907
Clarkson, Robert C.	Dec. 26, 1913
Clement, Victor M.	April 28, 1903
Cochran, A. P.	April 26, 1886
Colby, Charles L.	Feb. 26, 1896
Cole, Osman F.	Sept. 27, 1915
Coleman, Lester L.	Aug. 11, 1916
Coleman, Thomas C. . . .	Dec. 17, 1901
Collingwood, Francis. . .	Aug. 18, 1911
Colvin, Donald D.	July 2, 1912
Compton, Alfred G.	Dec. 12, 1913
Conlon, Frank J.	June 28, 1916
Conro, Albert.	Jan. 10, 1901
Constable, Casimir.	Feb. 6, 1905
Cooley, Lyman E.	Feb. 3, 1917
Cooper, Edward	Feb. 25, 1905
Coppée, Henry S.	May 8, 1901
Courtwright, Milton. . . .	April 25, 1883
Cox, Abraham B.	Feb., 1906
Crabb, Thomas.	Dec. 21, 1901
Crawford, William.	Jan. 27, 1913
Crosby, Horace.	July 24, 1914
Curran, Thomas F.	Jan. 8, 1918
Cushing, Robert D.	Aug. 23, 1903
Dagron, James G.	May 25, 1895
Davidson, George.	Dec. 2, 1911
Davis, Chester B.	Sept. 16, 1919
Davis, Frank P.	May 3, 1900
Davis, Harold.	Mar. 25, 1917
Davis, Joseph P.	Mar. 31, 1917
DeCourcy, Bolton W. . .	April 1, 1900
De Forest, George T. . . .	July 25, 1901
Defrees, Morris M.	Oct. 16, 1912
De Garay, Francisco. . . .	Sept. 2, 1896
DeHaas, Adolph.	Dec. 28, 1907
Del Monte, Emilio.	Mar. 20, 1902
*Dietrich, William H. . .	Aug. 11, 1920
Dimmick, John B.	June, 1909
D'Invilliers, Camille S. .	Jan. 2, 1910
Dodge, Grenville, M. . . .	Jan. 3, 1916
Doran, Frank C.	Oct. 15, 1898
Dorsey, Edward B.	Unknown
Duane, James.	Jan. 12, 1899
DuBarry, Edmund L. . .	Dec. 4, 1908
Dudley, Charles B.	Dec. 21, 1909
Duncklee, John B.	July 7, 1913
Dunham, Charles F. . . .	June 13, 1903
Dunn, Daniel B.	Mar. 18, 1916
Eayrs, Norman W.	May 13, 1900
Edwards, Nathaniel M. .	Unknown
Eldridge, Archibald R. .	Jan. 17, 1907
Eldridge, Griffith M. . . .	Aug. 30, 1912
Elliott, John S.	Mar. 25, 1913
Ellis, Samuel C.	Jan. 21, 1912

* Memoir promised but not yet received.

Members.	Date of Death.
Ely, George H.	Jan. 24, 1894
Emerson, George D.	Sept. 26, 1900
Enos, George W.	Nov. 2, 1905
Ensign, Elisha W.	Oct. 1, 1877
Ericsson, John	Mar. 8, 1889
Evans, George E.	April 14, 1908
Evans, Louis P.	Aug. 19, 1896
Evans, Myron E.	Feb. 16, 1907
Everest, Charles M.	July 22, 1917
Fales, Frank L.	Oct. 5, 1905
Fanning, John T.	Feb. 6, 1911
Fargo, William G.	Aug. 4, 1881
Farren, Bernard N.	Jan. 21, 1912
Fava, Francis R., Jr.	Mar. 27, 1896
Feild, Hubbard M.	April 11, 1920
*Field, William P.	Aug. 8, 1920
Filley, Hiel H.	May 6, 1907
Fink, Rudolph	Feb. 1, 1913
Fisher, Clark	Dec. 31, 1903
Fleming, *Sir* Sandford.	July 22, 1915
Floy, Henry	May 5, 1916
Flynn, Benjamin H.	Mar. 1, 1903
Ford, William G.	June 23, 1919
Frank, George W.	Jan. 19, 1905
Franklin, William B.	Mar. 9, 1903
Freeman, Ernest G.	Mar. 6, 1900
Freeman, Frank L.	Mar. 3, 1907
French, George H.	July 9, 1909
Frew, Archibald S.	Unknown
Fritz, John	Feb. 12, 1913
Fry, Leslie M.	Nov. 10, 1908
Fuertes, Estevan A.	Jan. 16, 1903
Fujino, Shukichi	Unknown
Gardiner, Edward	Unknown
Gardner, George C.	Aug. 12, 1904
Gardner, Martin L.	May 14, 1914
Garfias, Ignacio	Jan. 16, 1898
Gatchell, George S.	June 22, 1909
Gay, Charles W.	Feb. 1, 1918
Geddes, James K.	June 6, 1912
Geer, Harvey M.	Mar. 18, 1919
Geiger, Albert F.	Nov. 3, 1918
Gibson, William, Jr.	April 19, 1905
Gilchrist, Charles A.	May 20, 1920
Gilfillan, George A.	Mar. 13, 1916
Gilman, Charles C.	July 31, 1899
Golay, Philip	Oct. 31, 1898
Goodfellow, James G.	Mar. 23, 1918
Gorsuch, Robert B.	June 2, 1906
Gowen, Charles S.	Oct. 19, 1909
Grain, William	Jan. 10, 1877
Grassau, H.	May 16, 1880
Gray, Harry W.	Dec. 14, 1913
Greene, Charles E.	Oct. 17, 1903
Greene, Edward A.	April 19, 1903
Griffin, Eugene	April 10, 1907
Grimm, Henry E.	Dec. 12, 1912
Gurnee, Walter S.	April 17, 1903
Haight, Stephen S.	April 30, 1912
Haines, Frank M.	June 1, 1905
Hall, Henry A.	June 6, 1916
Hamilton, William G.	Jan. 23, 1913
Hamlin, Charles E.	Jan. 20, 1902
Hamlin, Homer	May 14, 1920
Handbury, Thomas H.	April 24, 1915
Handy, Edward A.	Nov. 21, 1907
Hannaford, Edmund P.	Aug. 19, 1902
*Hansen, Andrew C.	Feb. 9, 1920
Hardy, George R.	April 2, 1903
Hardy, Harry	April 4, 1919
Harper, John B.	Mar. 24, 1908
Harris, Charles M.	Oct. 28, 1909
Harris, Henry A.	Jan. 9, 1913
Harris, Robert L.	Sept. 29, 1896
Harrison, Stephen A.	June 6, 1898
Harrod, Thomas	Dec. 31, 1896
Hasell, Bentley D.	May 29, 1900
Hasie, Montague S.	May 30, 1907
*Hatton, Herbert W.	July 13, 1920
Haynes, Claude S.	May 4, 1914
Hazard, Erskine	Oct. 1, 1919
Hazen, Richard	Aug. 13, 1911
Herrick, Horace T.	May 26, 1913
*Herron, George M.	Feb., 1920
Herron, John	Feb. 2, 1912
Hill, William R.	June 16, 1918
Hilton, George P.	Oct. 7, 1909

* Memoir promised but not yet received.

Members.	Date of Death.
Hislop, John	Feb. 22, 1901
Hobson, Joseph	Dec. 19, 1917
Horton, John W.	Dec. 25, 1918
*Huff, Charles C.	Aug. 1, 1920
Hufschmidt, William P.	Aug. 13, 1914
Huggins, William	Feb. 21, 1918
Huntington, Collis P.	Aug. 13, 1900
Hutton, William R.	Dec. 11, 1901
Ives, Edward B.	Dec. 30, 1903
Jackson, Jones M.	Aug. 31, 1906
Jaques, William H.	Nov. 23, 1916
Jenkins, William D.	Mar. 12, 1914
Jennings, William T.	Oct. 24, 1906
Johnson, Archibald.	Oct. 3, 1899
Johnson, Lorenzo M.	Nov. 30, 1904
Johnson, William S.	Oct. 27, 1917
Johnston, Andrew L.	May 15, 1901
Jones, Benjamin F.	May 19, 1903
Jones, Grandville R.	Dec. 22, 1918
Jones, Washington	July 30, 1910
Just, George A.	Dec. 27, 1918
Keefer, Thomas C.	Jan. 7, 1915
Kellogg, Charles	Mar. 23, 1913
Kenyon, George C.	Oct. 30, 1906
Kimball, George A.	Dec. 3, 1912
King, Wallace, Jr.	Oct. 31, 1914
Kingsley, Marvin W.	Unknown
Kinney, Edward C.	Jan. 16, 1910
*Knap, Joseph M.	June 21, 1920
Knowles, Charles H.	Feb. 20, 1919
Kuersteiner, Emil E.	Mar. 10, 1913
Lange, Gunardo A.	July 24, 1915
Latrobe, Charles H.	Sept. 19, 1902
Lavalle, Louis R.	Nov. 15, 1905
Lawler, John	Feb. 23, 1891
Lawton, Frederick B.	Oct. 13, 1897
Leavitt, Erasmus D.	Mar. 11, 1916
*Le Conte, Louis J.	May 11, 1920
*Lehnartz, Frederick W.	Feb. 14, 1919
Leutzé, Trevor McC.	Oct. 14, 1901
Lewis, James F.	July 23, 1901
Lindenberger, C. H.	Jan. 5, 1905
Livingston, Julius I.	Mar. 1, 1910
Lombardo, Javier D.	Mar. 23, 1911
Long, Dennis	Oct. 8, 1893
Long, Thomas J.	Nov. 20, 1905
Loomis, Thomas H.	Feb. 11, 1920
Lord, Harold	Sept. 18, 1910
Lovecraft, Frederick A.	Oct. 26, 1893
Lowrie, Harvey C.	Mar. 26, 1911
Ludlow, William	Aug. 30, 1901
*Lueder, Archibald B.	Aug. 21, 1920
Lusk, James L.	Sept. 25, 1906
Lydon, William A.	Oct. 28, 1918
Lydston, Walter E.	May 8, 1910
MacAllister, Dickinson.	July 31, 1914
MacGregor, John	Jan. 21, 1913
MacHarg, William S.	May 6, 1910
Maclennan, John D.	Feb. 26, 1907
MacLeod, John	Jan. 21, 1900
McClure, Guy V.	Oct. 23, 1918
McCollom, Thomas C.	Jan. 4, 1917
McGrath, Wallace	Dec. 5, 1909
McKay, John E.	May 13, 1910
McLaughlin, John J.	Jan. 19, 1911
McNair, Thomas S.	July 25, 1901
Man, Albon P.	April 27, 1920
Manley, Herbert	Oct. 28, 1919
Mann, George E.	Oct. 2, 1897
Manter, Ralph B.	Feb. 2, 1911
Marden, Henry H., Jr.	Unknown
Marindin, Henry L.	Mar. 25, 1904
Marsland, Edward	June 25, 1898
Martin, Charles C.	July 11, 1903
Marvin, Frank O.	Feb. 6, 1915
Matson, Thomas H.	Dec., 1918
Maxim, *Sir* Hiram S.	Nov. 24, 1916
Maxwell, James R.	April 7, 1912
Mayer, August	Mar. 25, 1909
Melville, George W.	Mar. 17, 1912
Menocal, Aniceto G.	July 20, 1908
Merritt, David S.	Mar. 6, 1912
Mesa, Antonio E.	Feb., 1911
Meyer, Thomas C.	Jan. 26, 1908
Miles, John W.	Jan. 13, 1912

* Memoir promised but not yet received.

Members.	Date of Death.
Miller, Alexander M.	Sept. 14, 1904
Miller, Harvey C.	Nov. 20, 1917
Miller, Lora W.	Jan. 27, 1917
Milligan, Robert E.	Feb. 25, 1919
Mills, George C.	Aug. 3, 1919
Mills, James E.	July 25, 1901
Milne, Peter.	June 9, 1902
Miner, Charles A.	Mar. 22, 1912
Minturn, Rowland R.	April 7, 1898
Mitchell, Henry.	Dec. 1, 1902
Mix, Edgar H.	Jan. 7, 1914
Moffet, James D.	Nov. 3, 1899
Montony, Liberty G.	Oct. 20, 1909
Moore, Charles E.	Feb. 27, 1912
Morison, William S.	May 1, 1905
Morrell, William H.	Unknown
*Morrill, George S.	Feb. 9, 1920
Morris, William W.	Unknown
Morse, Charles J.	Dec. 6, 1911
Morse, Henry G.	June 2, 1903
Morton, Charles.	Aug. 28, 1909
Mosman, Alonzo T.	June 9, 1913
Mould, George A. H.	Jan. 21, 1917
Moulton, Mace.	April 27, 1909
Muenscher, Emory W.	Unknown
Murakami, Kyoichi.	Aug. 18, 1906
Murray, John B.	July 10, 1918
Myers, Edmund T. D.	May 12, 1905
Newham, Charles E.	Feb. 1, 1898
Newton, John.	May 1, 1895
Nickerson, Louis H.	May 6, 1877
Nicolls, William J.	Feb. 14, 1916
Norcross, Orlando W.	Feb. 27, 1920
Norman, George H.	Feb. 4, 1900
Norton, John T.	Aug. 5, 1905
Oastler, William C.	Mar. 31, 1914
Odell, Rutledge I.	Mar. 25, 1918
O'Hanly, John L. P.	Mar. 22, 1912
O'Melveny, John C.	Oct. 3, 1899
Opdyke, Stacy B., Jr.	Oct. 24, 1917
Osborn, Frank E.	Mar. 17, 1919
Osgood, Joseph Otis.	June 28, 1916
O'Sullivan, Thomas S.	Nov. 1, 1855
Palmer, Cornelius.	July 31, 1903
Palmer, Ray R.	Dec. 25, 1919
Parker, Charles F.	Oct. 10, 1898
Parker, William.	Sept. 30, 1909
Parkhurst, Henry W.	April 7, 1906
Parsons, Henry C.	April 5, 1919
Patch, Homer A.	April 4, 1911
Patterson, John A.	May 3, 1903
Pearson, Fred S.	May 7, 1915
Pearsons, Galen W.	Aug. 19, 1907
Perrine, Frederic A. C.	Oct. 20, 1908
Peters, John M.	July 21, 1914
Petheram, George T.	Oct., 1919
Petry, Alfred.	May 14, 1901
Pierce, Henry.	Aug. 21, 1911
Platt, Joseph C.	July 7, 1898
Plympton, George W.	Sept. 11, 1907
Poe, Orlando M.	Oct. 2, 1895
Porter, Albert H.	Aug. 9, 1899
Post, Andrew J.	Mar. 12, 1896
Post, Walter A.	Feb. 11, 1912
Powers, Joseph A.	Sept. 1, 1912
Poynor, David A.	May 29, 1906
Pratt, William A.	Sept. 19, 1904
Prevost, Sutherland M.	Sept. 30, 1905
Prichett, Frederic B.	Sept. 6, 1918
Prince, Edward.	Dec. 12, 1908
Probasco, Samuel R.	Jan. 19, 1910
Prosser, Thomas.	Jan. 6, 1896
Quinette de Rochemont, *Baron* Emile T.	Dec. 8, 1908
Quinlan, George A.	Aug. 29, 1901
Rannells, Clarence J.	Unknown
Ransome, Ernest L.	Mar. 5, 1917
Rathmann, Louis H.	Nov. 17, 1916
Raymond, Alfred.	Jan. 13, 1920
Redlich, Carl.	Jan. 5, 1918
Reece, Benjamin.	Dec. 17, 1901
Reed, Henry W.	Oct. 26, 1900
Reed, William B., Jr.	April 3, 1913
Rhett, Edmund M.	Oct. 10, 1918
Rhys-Roberts, E. A.	Oct. 5, 1909
Rice, Lewis F.	April 13, 1909

* Memoir promised but not yet received.

Members.	Date of Death.
Richardson, B. Frank.	April 18, 1904
Richardson, Clinton L.	July 7, 1910
Rickon, Frederic J. H.	Oct. 7, 1914
Rives, Alfred L.	Feb. 27, 1903
Robinson, George H.	July 4, 1906
Roebling, John A.	July 22, 1869
Rogers, Fairman.	Aug. 22, 1900
Rose, Charles C.	July 17, 1915
Rosecrans, William S.	Mar. 11, 1898
Rosenzweig, Alfred.	Jan. 13, 1904
Rosewater, Andrew.	April 17, 1909
Ross, Charles W.	April 11, 1916
Ross, James.	Sept. 20, 1913
Rothwell, Richard P.	April 17, 1901
Rumsey, Bronson C.	Unknown
Rusling, George McC.	Feb. 26, 1901
Russell, William G.	Mar. 5, 1915
Sanderson, James G.	Nov. 15, 1909
*Saph, Augustus V.	Oct. 29, 1912
Sauerman, Henry B.	May 20, 1919
Sayles, Robert W.	May, 1913
Schaub, Julius W.	Mar. 30, 1909
Schermerhorn, Louis Y.	April 3, 1908
Schlafly, Roy K.	Unknown
Schultz, Harold A. H.	Nov. 5, 1918
Schwitzer, John E.	Jan. 23, 1911
Scowden, Theodore R.	Dec. 31, 1881
Seaton, William, Jr.	Jan. 18, 1908
Seitzinger, William W.	Sept. 21, 1900
Sellers, Coleman.	Dec. 28, 1907
Shanks, Thomas P.	Jan. 7, 1904
Shanley, James R.	Aug. 25, 1910
Shanly, James M.	Nov. 28, 1912
Sheldon, Simeon.	Mar. 4, 1883
*Shepard, David C.	Aug. 7, 1920
Sherrerd, John M.	April 15, 1915
Shirreffs, Reuben.	Aug. 31, 1904
Sleeper, George E.	Oct. 25, 1908
Sleppy, Kirby B.	Aug. 4, 1918
Slifer, Hiram J.	Feb. 3, 1919
Smith, Cecil B.	July 1, 1912
Smith, Charles W.	July 29, 1920
Smith, Francis H.	April 7, 1915
Smith, Joseph S.	Mar. 26, 1907
Smith, Plumer H.	Jan. 18, 1918
Smith, William S.	Mar. 4, 1916
Smith, Willis R.	Aug. 1, 1918
Snyder, Francis E.	Dec. 23, 1905
Sonne, Otto.	Nov. 13, 1917
Sooysmith, Charles.	June 1, 1916
Sosa, Pedro J.	July 4, 1898
Speakman, Richard E.	Jan. 13, 1917
Spearman, Charles.	Aug., 1912
Speed, James B.	July 7, 1912
Spencer, Samuel.	Nov. 29, 1906
Spier, Charles L.	May 7, 1906
Spörck, Karl.	June 23, 1899
Stanton, Frank McM.	Sept. 11, 1916
Starr, William W.	Unknown
Stauffer, David McM.	Feb. 10, 1913
Stevens, George M.	Sept., 1918
Stevens, Harold C.	May 23, 1915
Stewart, Herbert.	Mar. 4, 1899
Storrow, Charles S.	April 30, 1904
Strong, Mason R.	Dec. 2, 1919
Suter, Charles R.	Aug. 7, 1920
Sweesy, Thomas K.	Sept. 2, 1911
Sweet, Elnathan	Jan. 27, 1903
Swinburne, George W.	Feb. 3, 1916
Sykes, George.	Aug. 21, 1919
Tallon, John J.	May, 1896
Tasker, Thomas T.	Aug. 19, 1877
Taubenheim, Ulrich.	Dec. 19, 1911
Taylor, William J.	Feb. 17, 1903
Temple, Robert H.	Dec. 23, 1901
Terry, Hiram E.	Mar. 8, 1915
Thompson, Ellis D.	Feb. 9, 1920
Thompson, Fred.	April 22, 1914
Thompson, Samuel C.	Feb. 28, 1920
Thompson, Wm. G. M.	May 12, 1903
Thornley, Julian.	Dec. 21, 1912
Thurston, Robert H.	Oct. 25, 1903
Tintorer y Giberga, J.	Jan. 8, 1914
Tönnesen, F. L. M.	Sept. 17, 1910
Torralbas, Rafael J.	Sept. 25, 1918
Torrance, William M.	May 18, 1920

* Memoir promised but not yet received.

Members.	Date of Death.
Tubbs, Joseph N.	Sept. 20, 1909
Turner, Edmund K.	May 6, 1915
Ubsdell, John A.	April 23, 1909
Upson, Warren W.	Sept. 2, 1918
*Value, Beverly R.	June 10, 1920
Van Buren, Robert	Dec. 16, 1919
Vanderpool, Eugene	July 12, 1903
Van Slooten, William	Dec. 14, 1901
*Van Winkle, Edgar B.	April 27, 1920
*Vaughan, George W.	June 5, 1920
Vaughan, Louis B.	July 22, 1920
Veazie, Joseph	Mar. 2, 1897
Vehrenkamp, Henry W.	April 25, 1913
Vielé, Maurice A.	April 10, 1915
Von Leer, Isaac W.	Nov. 23, 1916
Wainwright, Jonathan.	Oct. 11, 1907
Walker, George C.	April 12, 1905
Walker, Joseph M.	Jan. 7, 1908
Ward, Lebbeus B.	July 2, 1901
Warder, John H.	Aug. 30, 1915
Ware, Reuel W.	Sept. 10, 1903
Warman, Frederick C.	April 27, 1908
Waterbury, Leslie A.	June 15, 1918
Watkins, Frederick W.	Aug. 20, 1918
Watkins, John E.	Aug. 11, 1903
Watkins, Samuel D.	Sept. 7, 1911
Watson, Irvine	Nov. 24, 1915
Watson, James	Dec., 1910
Watson, William	Sept. 30, 1915
Way, Robert A.	April, 1901
Webster, Frank W.	Feb. 15, 1910
Weekes, Clifton L'O.	Oct. 8, 1918
Weeks, Harry A.	Sept. 22, 1918
Weir, Frederic C.	Mar. 1, 1899
Wellman, David W.	Aug. 18, 1898
Westinghouse, George	Mar. 12, 1914
Wetherill, William C.	Feb. 10, 1912
Wheaton, Edward	Mar. 6, 1889
Whitcomb, Henry D.	Jan. 26, 1910
White, David M.	Oct. 29, 1916
White, John W.	June 2, 1919
Whitney, Nelson O.	Mar. 18, 1901
Whitten, Nathan H.	Aug. 23, 1905
Wickes, Edward D.	June 11, 1915
Wilcox, Fred E.	Mar. 21, 1918
Williams, Edward H.	Dec. 21, 1899
Williams, William	Sept. 10, 1876
Wilson, Hugh M.	Sept. 6, 1919
Wilson, James	July 29, 1918
Wilson, William H.	Aug. 17, 1902
Wisner, George Y.	July 3, 1906
Wolkowyski, Alex. I.	Sept. 27, 1910
Wood, Henry S.	Dec. 5, 1913
Woodbury, Charles J. H.	Mar. 20, 1916
Woodbury, John McG.	Sept. 24, 1914
Worthington, Henry R.	Dec. 17, 1880
Wright, Joshua B.	Oct. 31, 1877
Wright, Moses H.	June 8, 1906
Würtele, Arthur S. C.	Mar. 20, 1899
Zabriskie, Aaron J.	April 15, 1914
Ziffer, Emanuel A.	Oct. 27, 1913

ENGINEERING SOCIETIES SERVICE BUREAU

Engineering Societies Service Bureau, established December 1st, 1918, as an activity of Engineering Council, is managed by a board made up of the Secretaries of the four Founder Societies, funds for its maintenance being provided by these Societies. The Bureau is co-operating with engineering organizations in all parts of the country and with the Re-employment Bureau under the auspices of the American Legion. It is desirous of increasing such co-operation by working with local engineering associations and clubs. The work of the Bureau since its inception has been largely in the line of securing employment for men retiring from government war service. Members of the American Society

* Memoir promised but not yet received.

of Civil Engineers who desire to register with this Bureau should apply for further information, registration forms, etc., to Walter V. Brown, Manager, Engineering Societies Service Bureau, First Floor, Engineering Societies Building, 29 West 39th Street, New York City.

SEARCHES IN THE LIBRARY

As the Library of the American Society of Civil Engineers has been merged in the Engineering Societies Library, requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York City, who will gladly give information concerning the charges for the various kinds of service. A more comprehensive statement in regard to this matter will be found on page 21 of the Year Book for 1920.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper. Written discussion on a given paper will be closed three months after the paper has been published, so that the author's closure can be printed four months after the paper, and the discussions and closure distributed in pamphlet form.

All manuscript submitted for publication should preferably be typewritten, and always double spaced. Drawings and diagrams should be on separate sheets, drawn to a scale suitable for about one-half to one-fourth reduction.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion will be set down for presentation to a future meeting of the Society, and, on these, oral discussion, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 35 of the Year Book for 1920.

LOCAL SECTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Section, Organized 1905.

M. M. O'Shaughnessy, President; Nathan A. Bowers, Secretary-Treasurer, 531 Rialto Building, San Francisco, Cal.

The San Francisco Section of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The

former are held at 6 P. M., at the Engineers' Club, 57 Post Street, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Section.

Informal luncheons are held at noon, every Wednesday, at the Engineers' Club, where special tables are reserved for members and guests of the Section.

The by-laws of the Section provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

Colorado Section, Organized 1908.

Oliver T. Reedy, President; John S. Means, Secretary-Treasurer, 1574 Marion Street, Denver, Colo.

The meetings of the Colorado Section of the American Society of Civil Engineers (Denver, Colo.) are held on the second Monday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesday, at 12.30 P. M., at Daniels and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

Atlanta Section, Organized 1912.

V. H. Kriegshaber, President; Park A. Dallis, Secretary-Treasurer, 1024 Candler Building, Atlanta, Ga.

Informal luncheons are held for members of the Section on the last Monday of each month, at 12.30 P. M., to which visiting members of the American Society of Civil Engineers will be welcomed. The place is not fixed, but this information will be furnished on application to the Secretary.

Baltimore Section, Organized 1914.

Ezra B. Whitman, President; George S. Robertson, Secretary-Treasurer, 1628 Linden Avenue, Baltimore, Md.

Cleveland Section, Organized 1914.

W. P. Brown, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

The regular meetings of the Section are held on the second Wednesday of each month, at 12.15 P. M., in the Rooms of the Electrical League, on the Fourteenth Floor of the Statler Hotel. Luncheon is served at these meetings, and visiting members are invited to attend.

Connecticut Section, Organized 1919.

Charles Rufus Harte, President; Clarence M. Blair, Secretary-Treasurer, 785 Edgewood Avenue, New Haven, Conn.

The Annual Meeting of the Section is held in April. The Section also holds fortnightly meetings alternating between Hartford and New Haven, Conn. These meetings are informal luncheon gatherings held usually at noon on Saturday, a notice being mailed to each member calling attention to the date, time, place, and subject for discussion. Members are privileged to invite guests regardless of their affiliation as engineers. No set speeches are scheduled, but certain members are asked to be prepared to present the assigned subject and lead in a general discussion.

Detroit Section, Organized 1916.

David A. Molitor, President; Dalton R. Wells, Secretary-Treasurer, 624 McKerchey Building, Detroit, Mich.

The regular meetings of the Section are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Section, Organized 1916.

David S. Carll, President; James H. Van Wagenen, Secretary-Treasurer, 719 Fifteenth Street, N. W., Washington, D. C.

Duluth Section, Organized 1917.

W. A. Clark, President; Walter G. Zimmermann, Secretary, Wolvin Building, Duluth, Minn.

The regular meetings of the Section are held at noon on the third Monday of each month (usually at the Kitchi Gammi Club), with luncheon, followed by a short business session and the reading of papers. Visiting members of the American Society of Civil Engineers can secure from the Secretary definite information relative to the meetings, at which they will be welcomed. The Annual Meeting is held on the third Monday in May.

Illinois Section, Organized 1916.

A. F. Reichmann, President; W. D. Gerber, Secretary-Treasurer, 913 Chamber of Commerce, Chicago, Ill.

The regular meetings of the Section are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meetings are not fixed, but this information will be furnished on application to the Secretary.

Iowa Section, Organized 1920.

J. E. Van Liew, President; R. W. Crum, Secretary, Iowa State College, Ames, Iowa.

Louisiana Section, Organized 1914.

A. T. Dusenbury, President; Eugene F. Deléry, Secretary, 602 Sewerage and Water Board Building, New Orleans, La.

The regular meetings of the Section are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nebraska Section, Organized 1917.

Clark E. Mickey, President; Homer V. Knouse, Secretary-Treasurer, 200 City Hall, Omaha, Nebr.

Regular meetings of the Section are held on the first Saturday of each month, except July and August, and at such places as may be appointed from time to time by the Executive Committee. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January.

Visiting members of the Society are especially urged to communicate with the Secretary when in the city.

New York Section, Organized 1920.

William J. Wilgus, President; W. T. Chevalier, Secretary, 17 Battery Place, New York City.

The Annual Meeting is held in May. The regular meetings of the Section are held in the Engineering Societies Building, 29 West 39th Street, New York City, on the third Wednesday of each month.

Northwestern Section, Organized 1914.

Charles L. Pillsbury, President; Paul C. Gauger, Secretary, 945 Osceola Ave., St. Paul, Minn.

The meetings of the Section are held bi-monthly, alternating between St. Paul and Minneapolis, on the third Friday of each month. Information as to the time and place of such meetings will be furnished on application to the Secretary.

Philadelphia Section, Organized 1913.

John Meigs, President; Henry T. Shelley, Secretary, 416 City Hall, Philadelphia, Pa.

The regular meetings of the Section are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the first Monday in January, April, and October, the last being the Annual Meeting. Special meetings are also held, in order to provide an opportunity for members to take a more active part in the work of the Section.

Pittsburgh Section, Organized 1917.

Morris Knowles, President; Nathan Schein, Secretary-Treasurer, 426 City-County Building, Pittsburgh, Pa.

Portland (Ore.) Section, Organized 1913.

J. C. Stevens, President; C. P. Keyser, Secretary, 318 City Hall, Portland, Ore.

The Annual Meeting of the Section is held on the second Friday in January. Other meetings are called by the President and are usually convened on Friday evenings. The place is not fixed, but this information may be obtained on application to the Secretary. All members of the American Society of Civil Engineers are cordially invited to attend the meetings.

St. Louis Section, Organized 1888 (Constitution Approved by Board, 1914).

Edward E. Wall, President; C. W. S. Sammelman, Secretary-Treasurer, 300 City Hall, St. Louis, Mo.

The Annual Meeting of the Section for the election of officers and for the transaction of business, is held on the fourth Monday in November. Two meetings each year, for the presentation and discussion of technical papers, are held in the Auditorium of the Engineers' Club of St. Louis and are open to members of the Associated Societies. Other "get-together" meetings are held regularly for dinner or luncheon on the fourth Monday of each month except July, August, and November.

San Diego Section, Organized 1915.

George Cromwell, President; R. C. Wueste, Secretary-Treasurer, Bonita, Cal.

The San Diego Section of the American Society of Civil Engineers meets on announcement. Pilgrimages to points of engineering interest are made at intervals throughout the year.

Seattle Section, Organized 1913.

John L. Hall, President; Bertram D. Dean, Secretary, 1711 Ravenna Boulevard, Seattle, Wash.

The regular meetings of the Section with luncheon, are held at the Engineers' Club, Arctic Building, Third Avenue and Cherry Street, at 12.15 P. M., on the last Monday of each month. Informal luncheons are also held at 12.15 P. M., every Monday at the Engineers' Club.

Special evening meetings are held from time to time for the purpose of discussing important topics, and information concerning these meetings may be had

by addressing the Secretary. All members in any grade of the American Society of Civil Engineers are cordially invited to attend the meetings when in the vicinity, and, if located in this District for any length of time, their membership in the Section will be appreciated.

Southern California Section, Organized 1914.

W. K. Barnard, President; Floyd G. Dessery, Secretary, 619 Central Building, Los Angeles, Cal.

The Southern California Section of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular monthly meetings on the second Wednesday of each month, the December meeting being the Annual Meeting.

Informal luncheons in connection with the Joint Technical Societies of Los Angeles are held at 12.15 P. M., every Thursday at the Broadway Department Store Café.

Spokane Section, Organized 1914.

Alfred D. Butler, President; Charles E. Davis, Secretary-Treasurer, 401 City Hall, Spokane, Wash.

The regular meetings of the Section are held on the second Friday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Visiting members are invited to attend the meetings.

Texas Section, Organized 1913.

Hans Helland, President; E. N. Noyes, Secretary, Deere Building, Dallas, Tex.

Utah Section, Organized 1916.

A. B. Villadsen, President, 304 Dooly Bldg., Salt Lake City, Utah.

The Annual Meeting of the Section is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the President.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcome in the Reading Rooms and at the meetings of many engineering societies in all parts of the world. A list of such societies will be found on pages 42 and 43 of the Year Book of the Society for 1920.

The Engineering Societies of Wisconsin, Madison, Wis., and Vereeniging van Waterstaatsingenieurs in Nederlansch Oost-Indie, are to be added to the above mentioned list, and members of these Societies are accorded the usual courtesies and privileges of the Headquarters of the Society.

NEW BOOKS*

(From August 1st to September 30th, 1920)

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

DONATIONS TO ENGINEERING SOCIETIES LIBRARY

THE DESIGN OF HIGHWAY BRIDGES OF STEEL, TIMBER, AND CONCRETE.

By Milo S. Ketchum. Second Edition, Rewritten. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., 1920. 548 pp., illus., diagrams, charts, tab., 9 x 6 in., flexible cloth. $6.00.

This new edition has been made necessary by the increase in live loads due to the extensive use of heavy motor trucks and tractors, and the increased use of reinforced concrete in highway bridge construction. The scope of the book has been extended to include the design of concrete and timber bridges as well as steel bridges. The discussion covers all the details of constructing highway bridges. This edition is uniform with the author's "Structural Engineers' Handbook".

A COURSE IN ELECTRICAL ENGINEERING: VOL. I:

Direct Currents. By Chester L. Dawes. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 496 pp., illus., 8 x 6 in., cloth. $4.00.

The present book is the first of two volumes which are intended to serve as a comprehensive text covering the general field of electrical engineering in a simple manner. It will be useful, the author believes, to students of electrical engineering as an introduction to more advanced texts and also to students who are studying the subject for general training, without the intention of becoming specialists. The treatment is detailed, straightforward, and systematic, but avoids much mathematical analysis.

WIRING FOR LIGHT AND POWER:

A Detailed and Fully Illustrated Commentary on the National Electrical Code. By Terrell Croft. Second Edition. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 465 pp., illus., tab., 8 x 5 in., flexible cloth. $3.00.

The purpose of this book is to supply explanations, elaborations, and illustrations for those sections of the National Electrical Code to which most frequent reference is necessary. For this purpose the most important Code regulations are given verbatim, and their application in practical electrical construction is explained by supplementary text and drawings. This edition has been fully revised to correspond with the 1918 edition of the Code.

MARINE ENGINEERS' HANDBOOK:

Prepared by a Staff of Specialists, Frank Ward Sterling, Editor-in-Chief. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 1486 pp., illus., tab., 7 x 5 in., flexible cloth. $7.00.

This handbook is compiled for the use of operating and designing engineers, and students. To cover the main subjects and the many ramifications of marine engineering, it has been necessary to enlist the services of thirty specialists, each of whom has received the hearty co-operation of others in the same field. The best endeavor has been made to co-ordinate different practices in order that all data may be reliable and unbiassed. The handbook is a pioneer in its field.

SHOP PRACTICE FOR HOME MECHANICS:

Use of Tools; Shop Practices; Construction of Small Machines. By Raymond Francis Yates. N. Y., The Norman W. Henley Publishing Co., 1920. 320 pp., illus., 9 x 6 in., cloth. $3.00.

The author's object has been to prepare a handy reference book for the amateur mechanic which would give processes that could be used without elaborate equipment or great expense.

TECHNICAL GAS AND FUEL ANALYSIS.

By Alfred H. White. Second Edition, Revised and Enlarged. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 319 pp., illus., tab., 8 x 6 in., cloth. $3.00.

The first edition of this work, which appeared in 1913, was intended to present the conclusions of the various committees of technical societies which had reported on the testing of fuels and their

* Unless otherwise specified, books in this list have been donated by the publishers.

utilization. Since 1913 the knowledge of gas and fuel analysis has been distinctly increased. Standard methods for sampling and analyzing coal and coke and for examining liquid fuels have been adopted by several societies. Methods for gas analysis have been critically studied and new methods developed. These advances have been carefully reviewed for this edition, which is about 20% larger than the former one.

FUEL OIL IN INDUSTRY.

By Stephen O. Andros. Chic., The Shaw Publishing Company, 1920. 214 pp., illus., tab., 9 x 6 in., cloth. $3.75.

The volume opens with a discussion of the physical and chemical properties of fuel oil, the principles of its combustion, a comparison of coal and oil as fuels, and a description of "colloidal" fuel. This is followed by chapters on the storage and distribution of oil, methods of heating, straining, and pumping, on the arrangement of boiler furnaces, and on types of burners. The remainder of the book describes the applications of fuel oil in steamships, locomotives, iron and steel manufactures, heat treating, central stations, the sugar, glass, and ceramic industries, and in heating buildings. The treatment is concise and practical rather than theoretical.

UTILISATION DES VAPEURS D'ÉCHAPPEMENT

Dans les Houillères en Vue de la Production d'Energie Electrique. By Adrien Barjou. Preface by Maurice Soubrier. Paris, Gauthier-Villars et Cie., 1920. 90 pp., illus., 10 x 6 in., paper.

The author of this work discusses the utilization of exhaust steam in low-pressure turbines for the production of electricity or compressed air. The particular case studied is that of coal mines which have outgrown their power plants and are faced with the necessity of extending them. The economic and technical results obtained with low-pressure turbines are set forth in this book.

WINGS OF WAR:

An Account of the Important Contribution of the United States to Aircraft Invention, Engineering, Development, and Production during the World War. By Theodore Macfarlane Knappen. With an Introduction by Rear-Admiral D. W. Taylor. N. Y. and Lond., G. P. Putnam's Sons, 1920. 289 pp., pl., 8 x 6 in., cloth. $2.50.

The story of the United States Army aircraft production programme is essentially one of confident hopes, bitter disappointments, failures, and successes such as inevitably attend the creation from nothing of an immense industrial organization. Until now, the history of this undertaking is chiefly found in the voluminous reports of investigating committees, which over-emphasize the failures and under-value the successes. The present book is an attempt to supply a less one-sided account of the Army air effort, one which will give a readable report of the problem, the methods used for its solution, and the net results obtained.

TEXTBOOK OF AERO ENGINES.

By E. H. Sherbondy and G. Douglas Wardrop. N. Y., Frederick A. Stokes Co., copyright 1920. 363 pp., illus., diagrams, pl., 12 x 9 in., cloth. $10.00.

The present work is a review of the theory and practice of the design of engines for aerial navigation. The first part treats of theory and includes the theory of the cycle, the work available, the effect of altitude, pressure, etc., on the power, and the theory and design of compressors. The second part describes the current types of American, British, French, German, and Italian engines. An Appendix gives tables of use to designers. The book is fully illustrated with drawings and photographs.

FLUGTECHNIK: GRUNDLAGEN DES KUNSTFLUGES.

By Arthur Pröll. München and Berlin, R. Oldenbourg, 1919. 332 pp., illus., 9 x 12 in., paper. 30.25 marks (33 marks, bound).

This treatise is founded on a manual of the scientific foundations of the subject, prepared for practical self-instruction while the author was director of the Aeronautical Experiment Station of the Austrian War Ministry. The notes prepared for this purpose were used later in connection with his lectures on technical aerodynamics in the Hannover High School, from which the present work has been prepared. The book, therefore, presents the subject from the view-point of immediate practical usefulness and also emphasizes the connection of aeronautical calculations with the teachings of mechanics. It will serve, the author believes, not only as a text for students, but will also enable the experienced engineer to carry out designs and construction in all details, when combined with practical numerical data. The discussion is confined to monoplanes and biplanes of the usual type.

ANALYSIS OF PAINT VEHICLES, JAPANS, AND VARNISHES.

By Clifford Dyer Holley. N. Y., John Wiley and Sons, Inc.; Lond., Chapman and Hall, Ltd., 1920. 203 pp., illus., tab., 8 x 6 in., cloth. $2.50.

The author, an experienced paint chemist, presents the methods used in his laboratory for the systematic examination of paint vehicles.

THE IRON AND STEEL INDUSTRY OF THE UNITED KINGDOM

Under War Conditions: A Record of the Work of the Iron and Steel Production Department of the Ministry of Munitions. By F. H. Hatch. Lond., privately printed for Sir John Hunter by Harrison and Sons, 1919. 167 pp., illus., pl., portraits, charts, tab., 10 x 6 in., cloth. (Gift of Author).

This volume is an interesting account of the methods used by the British Government to obtain the necessary increase in the steel production of Great Britain during the war. The vastness of the field covered, the variety and complexity of the technical problems involved, and the far-reaching industrial questions raised, made the subject one of great interest and importance.

THE OWNERSHIP AND VALUATION OF MINERAL PROPERTY:

Being an Elementary Treatise on the Nature of Mineral Interests and Royalties, and the Correct Method of Valuing Such Property for the Purposes of Sale, Probate, and Rating and Taxation, Together with a Statement of the Law Relating to Rating and Taxation. By Sir R. A. S. Redmayne and Gilbert Stone. Lond. and N. Y., Longmans, Green and Co., 1920. 256 pp., 9 x 6 in., cloth. $4.50.

The primary object of this book is to assist the mining expert who desires to have available a statement of the interests involved and the mode of valuing those interests in the mining industry generally. The work consequently contains, in addition to chapters on royalties and valuation, a general explanation of the law relating to mining interests, wayleaves, and subsidence, and also the law relating to the rating and taxation of mineral properties.

STEAM SHOVEL MINING:

Including a Consideration of Electric Shovels and Other Power Excavators in Open-Pit Mining. By Robert Marsh, Jr. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 258 pp., illus., tab., 9 x 6 in., cloth. $3.50.

The purpose of this volume is to present general information on the development and study of those mining problems which may best be solved by open-pit methods involving the use of power excavators. A general knowledge of mining practice is assumed.

MINE BOOKKEEPING:

A Comprehensive System of Records and Accounts for Mining Operations of Moderate Dimensions. By Robert McGarraugh. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 118 pp., illus., 9 x 6 in., cloth. $2.00.

This discussion of mine accounting is intended to show a system of records and accounts adequate for small mines, where the elaborate systems necessary for large-scale operations would require too large a clerical staff.

ACCOUNTS IN THEORY AND PRACTICE: PRINCIPLES.

By Earl A. Saliers. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 301 pp., 9 x 6 in., cloth. $3.00.

This volume, by an assistant professor of accounting in the Sheffield Scientific School, is intended as an introduction to the principles of accounts. An attempt has been made to attain an effective combination of theoretical discussion and practical application. Bibliographies are given with each section of the book. Contents: Fundamental Principles; Partnership Accounting; Expansion of Accounting Records; Corporation Accounting; Financial Statements; Special Application of Principles.

THE BUSINESS MAN AND HIS BANK.

By William H. Kniffin. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 278 pp., illus., 8 x 6 in., cloth. $3.00.

This volume treats banking from the viewpoint of the customer and is intended to assist the business man to that knowledge which will enable him to select his bank, to make proper use of it, and to understand the ways in which it can aid him in his business.

ADVERTISING THE TECHNICAL PRODUCT.

By Clifford Alexander Sloan and James David Mooney. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 365 pp., illus., 9 x 6 in., cloth. $5.00.

This book—the work of two men experienced in advertising technical products—is a discussion of the more important factors of the problem. The subjects discussed are the economic elements of such advertising, the instruments available for it, the preparation of technical advertisements and advertising organizations. An interesting collection of actual advertisements, with critical comments and a brief bibliography, are included in the book.

HOW TO MANAGE MEN:

The Principles of Employing Labor. By E. H. Fish. N. Y., The Engineering Magazine Co., 1920. 337 pp., 9 x 6 in., cloth. $5.00.

This book is a discussion of the relations between workers and their employers, in which an attempt is made to evaluate the things that go to make a satisfactory working organization. The author discusses the establishment of an employment department, the problems of the employment manager, the promotion of industrial relations, and industrial education.

PERSONNEL ADMINISTRATION:

Its Principles and Practice. By Ordway Tead and Henry C. Metcalf. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 538 pp., 9 x 6 in., cloth. $5.00.

The purpose of this book is to set forth the principles and the best prevailing practice in the field of the administration of human relations in industry. It is addressed to employers, personnel executives, employment managers, and students of personnel administration, but will have value, the author hopes, also for all who are interested in advancing right human relations in industry and in securing a productivity that is due to willing human co-operation, interest and creative power. The field covered includes those efforts usually included in personnel management: employment, health, and safety, training, personnel relations, service features and joint relations. The book also seeks to show the relation of the personnel problems of each corporation to those of its industry as a whole, by considering the activities of employers' associations and organizations of workers.

MATHEMATICS FOR ENGINEERS; PART II.

By W. N. Rose. N. Y., E. P. Dutton and Co., 1920. 419 pp., illus., tab., 9 x 6 in., cloth. $7.00.

The work of which this is the second volume is intended to occupy a position midway between those written for college students, which are usually academic in character, and those practical books which omit any discussion of the scientific basis underlying them. It is intended to contain all the mathematical work needed by engineers in their practice and by students of all branches of engineering. This volume treats of the differential and integral calculus, spherical trigonometry, and mathematical probability.

VOCATIONAL ARITHMETIC.

By Clarence E. Paddock and Edward E. Holton. N. Y. and Lond., D. Appleton and Co., 1920. 232 pp., illus., tab., 7 x 5 in., cloth. $2.00.

This is an elementary arithmetic for vocational schools and mechanics, in which the usual branches of arithmetic are treated in a simple way and accompanied by a large number of practical problems, carefully selected, to present applications to such vocations as shopwork, carpentry, masonry, foundry work, and excavation.

MacRAE'S BLUE BOOK.

Chic. and N. Y. MacRae's Blue Book Co., 1920. 1853 pp., 11 x 9 in., cloth. $10.00.

An alphabetically arranged directory of American manufacturers, which is especially full with respect to iron and steel products, and the materials used by railways and in building. In addition to the directory of materials, it contains a list of addresses, and also of trade names, a standard list of prices, and a collection of data used by buyers. Thirty thousand firms are included.

HENLEY'S TWENTIETH CENTURY FORMULAS, RECIPES, AND PROCESSES:

Containing Ten Thousand Selected Household and Workshop Formulas, Recipes, Processes, and Money-Saving Methods for the Practical Use of Manufacturers, Mechanics, Housekeepers, and Home Workers. Edited by Gardner D. Hiscox. 1920 Edition, Revised and Enlarged. N. Y., The Norman W. Henley Publishing Co., 1920. 807 pp., 9 x 6 in., cloth. $5.00.

The formulas in this volume cover a wide range of manufactures and operations. They have been collected from a variety of sources, special attention having been paid to foreign publications not usually available. In this edition the work has been modernized.

RAILROAD CURVES AND EARTHWORK.

By C. Frank Allen. Sixth Edition, Revised. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 289 pp., diagrams, charts, tab., 7 x 4 in., flexible cloth. $4.00.

This book has been prepared for the use of the students in the author's classes at the Massachusetts Institute of Technology, but it will also, he believes, be useful to engineers who have to deal with earthwork computation or curves. The new edition is marked by an extension of the treatment of circular arcs; by new methods for the computation of earthwork, additional data on haul, and by general revision.

HANDBOOK FOR HEATING AND VENTILATING ENGINEERS.

By James D. Hoffman, Assisted by Benedict F. Raber. Fourth Edition. N. Y. and Lond., McGraw-Hill Book Co., 1920. 478 pp., illus., tab., 7 x 4 in., flexible cloth. $4.50.

This volume is intended to fill the need of those engaged in the design and installation of heating and ventilating apparatus for a pocket-book covering the entire subject in simple form and containing the tables commonly used. The present edition has been entirely rewritten and reset, and considerably enlarged, to bring it into accord with present practice. There is also a supplement entitled: "A Course of Instruction for Technical Schools with Questions, Problems and References, to be Used in Connection with the Handbook for Heating and Ventilating Engineers," which contains 51 pages and is bound in paper.

EARTHWORK AND ITS COST:

A Handbook of Earth Excavation. By Halbert Powers Gillette. Third Edition. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1920. 1346 pp., illus., tab., 7 x 5 in., flexible cloth. $6.00.

This treatise covers systematically and comprehensively the methods of excavating for engineering work of all kinds. In addition to the results of his own experience, the author has included a summary of the material in American technical literature. Particular attention is given to cost data. The present edition has been revised.

STRUCTURAL STEELWORK:

Relating Principally to the Construction of Steel-Framed Buildings. By Ernest G. Beck. Lond. and N. Y., Longmans, Green and Co., 1920. 462 pp., illus., tab., 9 x 6 in., cloth. $7.50.

This book presents information likely to be of use in the design and construction of ordinary steel-framed structures. The principal endeavor has been to be broadly suggestive, rather than particular or exhaustive, to propose common-sense lines of argument based on straightforward consideration of the facts, instead of attempting to generalize or formulate specific relations from details which cannot be more than typical. The work follows British practice, and is based upon a series of articles contributed to *The Mechanical World.*

SURVEYING.

By W. Norman Thomas. Lond., Edward Arnold, 1920. 537 pp., illus., pl., maps, tab., 9 x 6 in., cloth. $10.50. (Gift of Longmans, Green and Company.)

The author of this treatise is Lecturer in Civil Engineering in the University of Birmingham, England, and the volume is an amplification of his lectures to students. It is intended as a text-book and a reference book for surveyors in practice. Calculus is used where necessary, and a special effort has been made to keep the investigation of errors before the reader's mind. Contents: Chain Surveying; Optics and Magnetism; Instruments; The Theodolite; Theodolite Surveying and Dialing; The Level and Leveling; Trigonometrical and Barometrical Leveling; Tacheometry and Rangefinding; Plane Table Surveying; Curve Ranging; Earthwork Calculations; Hydrographic Surveying; Triangulation; Base Line Measurement; Spherical Trigonometry; Astronomical Terms; Meridian, Longitude, Latitude and Time; Photographic Surveying; Appendix: Errors in Surveying; Trigonometrical Formulas; Miscellaneous Examples.

HYDRAULIC TABLES:

The Elements of Gagings and the Friction of Water Flowing in Pipes, Aqueducts, Sewers, etc.; Flow of Water over Sharp-Edged and Irregular Weirs and the Quantity Discharged. By Gardner S. Williams and Allen Hazen. Third Edition, Revised. N. Y., John Wiley and Sons, Inc.; Lond., Chapman and Hall, Ltd., 1920. 115 pp., illus., pl., tab., 9 x 6 in., cloth. $2.00.

The third edition of these well-known tables has been carefully corrected and revised in minor points, and a new chapter has been added, in which the additional data that have accumulated during the fifteen years since the tables first appeared are examined to ascertain whether changes or adjustments in the formula are needed.

DREDGING ENGINEERING.

By F. Lester Simon. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1920. 182 pp., illus., pl., tab., 9 x 6 in., cloth. $2.50.

The author of this volume has attempted to supply a work which will describe the principal types of dredges in such a manner as to impart a fundamental working knowledge of their construction and operation. He also takes up concisely the problems that confront the engineer in the conception and accomplishment of dredging projects.

MEMBERSHIP

(From September 2d to October 7th, 1920)

ADDITIONS

MEMBERS		Date of Membership.
Balch, Leland Rella. Asst. Engr., with Daniel W. Mead and Charles V. Seastone, State Journal Bldg., Madison, Wis.	Assoc. M. M.	Oct. 5, 1909 Aug. 12, 1920
Bassett, William Austin. Chf., Div. of Eng. and Public Works, New York Bureau of Municipal Research, 261 Broadway, New York City.		Aug. 9, 1920
Baughman, Charles Alton. Head of Civ. Eng. Dept. and Prof. of Civ. Eng., Alabama Polytechnic Inst., Auburn, Ala.	Assoc. M. M.	Sept. 11, 1917 Aug. 12, 1920
Bear, Ernest Ruby. Engr., Turner Constr. Co., 127 Linden Ave., Rutledge, Pa.	Assoc. M. M.	Mar. 2, 1915 Aug. 12, 1920
Boyd, Robert Platt. Highway Engr., Parish of Ouachita, Box 375, Monroe, La.	Assoc. M. M.	June 11, 1917 Aug. 12, 1920
Challies, John Bow. Secy., Dominion Water Power Board; Member and Secy., Dominion Power Board; Member, Lake of Woods Technical Board, Care, Dominion Water Power Branch, Ottawa, Ont., Canada.	Assoc. M. M.	Sept. 2, 1914 Aug. 12, 1920
Charles, Robert Simpson. Field Mgr., Layne & Bowler Co., 1112 Tutwiler Ave., Memphis, Tenn.		Aug. 9, 1920
Cummings, Leroy Webster. Federal Bldg., South Chicago, Ill.		June 1, 1920
Dimelow, Harry Kempfield. Div. Engr., Braden Copper Co., Rancagua, Chile.		Aug. 9, 1920
Fixen, Victor Leroy. Dist. Mgr., C. A. P. Turner Co., 5 South Wabash Ave., Chicago, Ill.	Assoc. M. M.	Sept. 12, 1916 Aug. 12, 1920
Frickstad, Walter Nettleton. Senior Highway Engr., Bureau of Public Roads, 403 Col. Hudson Bldg., Ogden, Utah.	Assoc. M. M.	June 5, 1907 Aug. 12, 1920
Friend, Fred Foraker. Care, Barahona Sugar Co., Barahona, Dominican Republic.	Assoc. M. M.	April 18, 1916 Aug. 12, 1920
Harper, Sinclair Ollason. Project Mgr., U. S. Reclamation Service, Grand Junction, Colo.	Jun. Assoc. M. M.	Mar. 31, 1908 Jan. 3, 1911 Aug. 12, 1920
Holcomb, Alpheus Elton. Sales Engr., Koehring Machine Co., 351 Second Ave., Wauwatosa, Wis.		Aug. 9, 1920
Koeper, Landry Lafayetta. Engr. and Mgr., Waneta Power Co., Ltd., 1121 Paulsen Bldg., Spokane, Wash.		Aug. 9, 1920
LeVan, Alvin. Structural Engr. (The Canfield Eng. Co.), 406 Flynn Bldg., Des Moines, Iowa.		Aug. 9, 1920
Mieth, Richard Elam. Mgr., Portland Bridge Co., 822 Yeon Bldg., Portland, Ore.	Jun. Assoc. M. M.	May 1, 1906 Mar. 4, 1913 Aug. 12, 1920
Miller, Claude Webster. Div. Engr., State of Arizona, Box 797, Prescott, Ariz.		Aug. 9, 1920
Morrison, George Eldridge. Chf. Engr., Hess & Skinner, Box 640, Dallas, Tex.	Assoc. M. M.	Nov. 1, 1910 Aug. 12, 1920

MEMBERS (*Continued*)

		Date of Membership.
PIERSON, ALBERT WARING. Land Engr., The Niagara Falls Power Co., 728 Seventh St., Niagara Falls, N. Y....	Assoc. M.	April 2, 1912
	M.	Aug. 12, 1920
ROBB, JAMES HOWARD. Div. Engr., O. W. R. R. & N. Co., Union Station, Spokane, Wash....		July 6, 1920
ROBINSON, AMOS DEAN. Calculator, Columbia Basin Survey Comm., 737 Euclid Ave., Spokane, Wash....		July 6, 1920
ROSE, ALEXANDER. Archt. and Engr., 500 Builders Exchange, Minneapolis, Minn....	Assoc. M.	Nov. 26, 1918
	M.	Aug. 12, 1920
SLOCUMB, EDWARD CLYDE. Senior Highway Engr., U. S. Bureau of Roads, 4106 Blaisdell Ave., Minneapolis, Minn....		July 6, 1920
TAIT, CLARENCE EVERETT. 601 Federal Bldg., Los Angeles, Cal....		July 6, 1920
WARDLE, JOSEPH DOMAN. Chf. Engr., Iowa Ry. & Light Co., 1520 Second Ave., Cedar Rapids, Iowa....		July 6, 1920
WARREN, MINTON MACHADO. Hydr. Div., Eng. Dept., Stone & Webster, 147 Milk St., Boston, Mass....	Jun.	Nov. 4, 1914
	Assoc. M.	May 15, 1917
	M.	Aug. 12, 1920
WARREN, WILLIS DOW PECK. Cons. Engr. (Miller, Holbrook, Warren & Co.), Millikin Bldg., Decatur, Ill..	Assoc. M.	April 7, 1915
	M.	Aug. 12, 1920
WHITEAKER, ROBERT ORLANDO. City Engr.; (Whiteaker & Washington); County Highway Engr., Johnson County, Cleburne, Tex....	Assoc. M.	Dec. 2, 1914
	M.	Aug. 12, 1920
WILSON, ALLEN RUTHERFORD. Asst. Engr., Bridge Dept., P. R. R., 118 McKinley Ave., Lansdowne, Pa....		Aug. 9, 1920
WRIGHT, HERBERT JAMES. Asst. Supt. of Operations and Plant Engr., The Barrett Co., Chemical Dept., Frankford (Res., 1219 Chelten Ave., Oak Lane), Philadelphia, Pa....	Assoc. M.	May 15, 1917
	M.	Aug. 12, 1920
YOUNG, FREDERICK CHARLES. Contr. Engr., Moore-Young Constr. Co., 228 South St., Waterloo, Iowa....	Assoc. M.	Feb. 4, 1914
	M.	Aug. 12, 1920

ASSOCIATE MEMBERS

AMES, JOHN HOLLETT. Bridge Engr., Iowa Highway Comm., 603 Northwestern Ave., Ames, Iowa....		July 6, 1920
BARIEAU, JEROME ERIC. County Surv., Placer County, East Auburn, Cal....		Mar. 9, 1920
BENNETT, JOSEPH GARDNER. Instr., Univ. of Wisconsin, 438 North Francis St., Madison, Wis....		Aug. 9, 1920
BUENTE, WILLARD HARRISON. Asst. Engr., The W. G. Wilkins Co., 909 Westinghouse Bldg. (Res., 4011 Vinceton St., N. S.), Pittsburgh, Pa....		Aug. 9, 1920
BUTLER, GORDON HUBERT, SR. Supt. of Constr., Stack Constr. Co., 12 St. Paul Ave., Duluth, Minn....		Aug. 9, 1920
CARDWELL, MILTON MARION. Chf. of Survey Party, Alabama State Highway Dept., Centerville, Ala....		Aug. 9, 1920
CHASE, CLEMENT EDWARDS. Asst. Engr., Ralph Modjeski, 101 Park Ave., New York City....	Jun.	Oct. 1, 1912
	Assoc. M.	April 19, 1920
CHENOWETH, ALBERT AUSTIN. (Chenoweth & Rettinghouse), 210 Boyce-Greeley Bldg., Sioux Falls, S. Dak....		July 6, 1920

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
CHOUINARD, WILLIAM JAMES. Senior Bridge Draftsman, King County Engr.'s Office, Box No. 8, Duvall, Wash.	Jun. Feb. 4, 1914 Assoc. M. June 1, 1920
CROWLEY, ORVILLE WILFRID. Capitol Extension Engr., State House, Des Moines, Iowa	April 19, 1920
DUNLAP, HERBERT ALLEN. Mgr., Supply Div., Unit Constr. Co., Fall River, Mass.	June 1, 1920
FINNEY, ROY A. Vice-Pres. and Chf. Engr., The Shawnee Eng. Co. (Res., 1207 Tyler St.), Topeka, Kans.	Aug. 9, 1920
GARDINER, HARRY MYRON. 30 Kimberly Court, Detroit, Mich.	June 1, 1920
GERIG, FRANCIS AUSTIN. Box 395, Albany, Ala.	Jun. Sept. 10, 1918 Assoc. M. Aug. 9, 1920
HOMER, LANGLEY STODDARD. Care, Turner Constr. Co., Boulevard and East Ave., Atlanta, Ga.	Aug. 9, 1920
HUNT, RUSSELL WOOLSTON. Res. Engr. and Prin. Asst. to Res. Chf. Engr. on Constr. for Clyde Potts, Boonton (Res., 203 Ross Pl., Westfield), N. J.	July 6, 1920
LABARRE, ROBERT V. Care, The Foundation Co., Rifa 332, Lima, Peru.	Aug. 9, 1920
LEWIS, MORTIMER REED. (Hays, Sloan & Lewis), 306 Boise City National Bank Bldg., Boise, Idaho	June 1, 1920
MCFARLAND, DANIEL ROBERT. 740 North 10th St., Grants Pass, Ore.	Aug. 9, 1920
MAYNARD, CLARENCE FRANCIS. R. F. D. 3, Oakman, Ala.	July 6, 1920
MIEDWIG, ANDREW. 329 East 30th St., Baltimore, Md.	July 6, 1920
MILLER, GARNER WAKEFIELD. (Ayres & Miller), 800 McCall Bldg., Memphis, Tenn.	Jun. Jan. 2, 1912 Assoc. M. Aug. 9, 1920
ROBBE, LOUIS ERNEST. Asst. Engr., Board of Water Supply, Gilboa, N. Y.	April 19, 1920
ROSS, DANIEL. 1011 Alaska Bldg., Seattle, Wash.	April 19, 1920
STEVENS, JOHN HOYT. Box 131, Massena, N. Y.	Aug. 9, 1920
SWARTZ, PAUL. Contr. Associate, W. P. Hilton, C. P. A., 616 Graydon, Park, Norfolk, Va.	July 6, 1920
TURNBULL, PAUL HORNE. Asst. Gen. Supt. of Constr., Geo. F. Pawling & Co., 5926 Locust St., Philadelphia, Pa.	June 1, 1920
VAN ETTEN, PERCY HIXON. 37 Creso Apartments, Tacoma, Wash.	Jun. Feb. 4, 1913 Assoc. M. June 1, 1920
WESSEL, ALBERT HENRICH. Chf. Engr., Toronto Office, Bernhard H. Prack, 50 Bay St., 6th Floor, Toronto, Ont., Canada	June 1, 1920
WILL, WALTER GEORGE. 437 West Wyandot Ave., Upper Sandusky, Ohio.	July 6, 1920
WOODRUFF, MORGAN LEWIS. Draftsman, Charles T. Main, Box 211, Marshfield, Mass.	Aug. 9, 1920
YANG, PAO-LING. Eng. Advisor, The Directorate Gen. of Flood Relief and Conservancy, Chihli River Comm., Tientsin, China	July 6, 1920

JUNIORS

DURGIN, CASPER MARSHALL. Junior Hydrographic and Geodetic Engr., U. S. Coast and Geodetic Survey, Washington, D. C.	July 6, 1920
GREENHALGH, SIDNEY FRANKLYN. Draftsman, Eng. Dept., James Stewart & Co., Inc., R. F. D. No. 1, Rahway, N. J.	June 1, 1920

JUNIORS (*Continued*)

	Date of Membership.
HAHN, CORNMAN LOUIS. 2d Lieut., Corps of Engrs., U. S. A., 4th Engrs., Camp Lewis, Wash.	July 6, 1920
KEEFER, CLARENCE EDWARD. Asst. Designing Engr., Sewer Div., Highways Engr. Dept. (Res., 235 North Stricker St.), Baltimore, Md.	June 1, 1920
KIBBE, HARMON CONDIT. 2722 Ashby Ave., Berkeley, Cal.	Aug. 9, 1920
READY, ARTHUR GEORGE. 592 East 22d St., Brooklyn, N. Y.	July 6, 1920

DEATHS

DIETRICH, WILLIAM HENRY. Elected Associate Member, January 4th, 1910; died August 11th, 1920.

GATES, CHRISTOPHER LAWRENCE. Elected Junior, December 4th, 1878; Member, September 5th, 1883; died August 30th, 1920.

HUFF, CHARLES CLAYTON. Elected Associate Member, November 12th, 1913; died August 1st, 1920.

LEIGHTON, GEORGE. Elected Member, October 3d, 1906; died September 13th, 1920.

LUEDER, ARCHIBALD BYRON. Elected Member, May 31st, 1910; died August 21st, 1920.

MOORE, WILLIAM HARLEY. Elected Member, June 4th, 1895; died September 5th, 1920.

THACHER, EDWIN. Elected Member, February 17th, 1869; died September 21st, 1920.

Total Membership of the Society, October 7th, 1920, 9 687.